

TAPR Spread Spectrum Special Interest Group Archive, January 1997 through December 1997

January 1997 through December 1997

TAPR's technical forum for applying spread-spectrum communications to amateur packet-radio networking, including chipsets and modems, Part 15 wireless LAN hardware, direct-sequence and frequency-hopping systems, CDMA, interference, shared spectrum, and development projects.

This volume contains 12 original monthly files and 1,133 messages, arranged chronologically. The PDF is a readable access copy: MIME transfer encodings are decoded, HTML bodies are converted to plain text, and non-text attachments are represented by descriptive notes. The raw source text is supplied separately with the Internet Archive item.

Month	Messages	Original source file
1997-01	189	ss.9701
1997-02	98	ss.9702
1997-03	169	ss.9703
1997-04	110	ss.9704
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January 1997

Original source file: ss.9701

Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9701

1. Re: [SS:766] Re: .. Process Gain

From: Dirk Koopman <djk@tobit.co.uk>
Date: Wed, 1 Jan 1997 11:49:59 +0000 (GMT)
To: Phil Karn <karn@qualcomm.com>
Cc: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970101114700.811B-100000@dirku.tobit.co.uk>
Rendered body type: text/plain

On Tue, 31 Dec 1996, Phil Karn wrote:

> Yes, FEC will beat thermal noise -- to a point. That point is the
> Shannon limit for an infinite bandwidth channel: -1.6 dB Eb/N0 . Note
> the units; Eb is the energy in joules per *user data bit* (NOT energy
> per chip, or energy per coded modulation symbol or anything else), and
> N0 is the thermal noise spectral density in watts/hertz. Since joules
> = watts/hz, the ratio is dimensionless.
>

There was some talk awhile back about incorporating FEC into the spreading codes (as opposed to the data). Was this a wild idea (or my misunderstanding) or is it possible and what does it mean in terms of usefulness.

Dirk

--

Dirk-Jan Koopman Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than
the piano when played by a sister or near relation." --Oscar Wilde

2. Re: [SS:766] Re: .. Process Gain

From: Dirk Koopman <djk@tobit.co.uk>
Date: Wed, 1 Jan 1997 11:57:49 +0000 (GMT)
To: Phil Karn <karn@qualcomm.com>
Cc: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970101115352.811C-100000@dirku.tobit.co.uk>
Rendered body type: text/plain

On Tue, 31 Dec 1996, Phil Karn wrote:

> >Hmmm... Thinking of FEC at SS is interesting and I'll go with that. But
> >is it true that it will beat wideband thermal noise? As we add longer FEC
> >codes (increasing the number of errors we can correct for), we have to
> >increase the signaling rate (to keep the information rate constant). That
> >means wider bandwidths, more noise power, and worse S/N.

I suppose this is sort of related, but one of the things that I am confused about is practical freq reuse in DS system. Can you practically have n different 'channels' (with different spreading codes) centred on the same freq with the txcvrs in close proximity (assuming the powers/proximity is adjusted so that normal swamping doesn't occur).

Dirk

--

Dirk-Jan Koopman Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than
the piano when played by a sister or near relation." --Oscar Wilde

3. Re: Backbone

From: "Jim Archer" <jarcher@tiac.net>
Date: Thu, 02 Jan 97 01:29:48 -0400
To: "ss@tapr.org" <ss@tapr.org>
Message-ID: <199701020629.BAA06144@mailnfs0.tiac.net>
Rendered body type: text/plain

On Tue, 31 Dec 1996 10:50:29 -0600 (CST), Steve Sampson wrote:

>What do you want to do?
>
>1. Do you want to create a backbone for a low-baud AX.25 network?
>2. Do you want to Network several workstations?

Well, I would like to network about five workstations, and have one of the workstations route to the Internet. It occurred to me that if the digipeater is also doing the routing, there would be no throughput loss between any station and the Internet caused by the digi, since it would not be digi-ing at that point.

>Extrapolate your usage. Down the road you will no doubt be running
>multiple network connections to multiple servers/workstations. It's
>hard to visualize a radio network in ethernet terms, as the radios
>can't be in parallel. If you stick with a serial network, sooner or
>later it will collapse, with the nodes in the middle doing all the
>work.

Yes, I see what you mean. I have never designed a LAN in which all the workstations were not visible to all the others on its segment (Ethernet and Token Ring). I guess the best thing to do it to have a "server" for each small area where all radios can hear each other, but this seems expensive.

I guess my problem is that I don't understand how the radios work in multipoint mode verses point-to-point mode. In multipoint mode, is each node assigned a time slice? If so, is each time slice as long as it takes to transmit a frame? If so, that seems like it would reduce the max theoretical throughput to 172Kbps divided by the number of nodes.

In point to point, If that means each node can only communicate with one other node, and we wanted only one radio per node, I suspect each node could communicate directly with a digipeater, but only if the digipeater can have a broadcast mode.

Anyhow, I think if I look into what these radios do and how they do it, I'll be able to come up with a half way decent way to deploy the LAN. Thanks for your advice!

Jim

```
*****
* PGP Key available from:  www.tiac.net/users/jarcher
*
* Fingerprint:
* 56 BA 7B 48 22 5C 1D BD  CB 15 F2 AC B3 32 24 A8
*****
```

4. FreeWave...

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Thu, 2 Jan 1997 12:15:50 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.91.970102121131.23084A-100000@tekdata.com>
Rendered body type: text/plain

Hi.. I assume everyone who is presently using these radios are doing so with them (relatively) unmodified.

I am unclear if an unmodified unit attached to a Yagi is still a part 15 device or not? Doesn't part 15 have a EIRP limit? Or is it just the power output limit.

I don't know many hams near me that are interested, but I could rustle up a few non-hams for Part 15 if that is the case.

Fred M. Spinner, KA9VAW
fred@tekdata.com KA9VAW@amsat.org

5. Re: [SS:717] Re: ss

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Thu, 2 Jan 1997 12:17:26 -0600 (CST)
To: ss@tapr.org
Cc: ss@tapr.org
Message-ID: <Pine.BSF.3.91.970102121625.23084B-100000@tekdata.com>
Rendered body type: text/plain

On Fri, 27 Dec 1996, Greg Jones, WD5IVD wrote:

> Lots of people use TNC-1 with the KISS EPROMs installed. I have one in the
> corner doing KISS as I type this message. Does a good job.
>
> There was an upgrade to the TNC-1 to make it into a TNC-2 years and years
> ago. Maybe you are talking about some other upgrade long before I was
> involved.

Unless you double clock the TNC-1 the turn around time is too poor with the
KISS TNC-1 code. I have one in a closet too...

>
> Cheers - Greg
>
> >This is news to me! If someone is still using TAPR-1's, and wants another,
> >how about giving me a call? Unless the upgrade we were promised is soon
> >coming, I kind of want to get rid of this albatross....de alan
> >
> >>> (if i'm going to own a white elephant i want a pair to breed)
> >>
> >>I don't see these as a white elephant, There are still people using there
> >TNC-1 units. Are those white
> >>elephants? If they are, people are still getting good use out of them.
>

Fred M. Spinner, KA9VAW
fred@tekdata.com, KA9VAW@amsat.org

6. Re: [SS:770] FreeWave...

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Thu, 2 Jan 1997 11:50:52 -0800
To: ss@tapr.org
Message-ID: <v03010d00aef1c1e2c466@[204.118.182.22]>
Rendered body type: text/plain

At 1:06 PM -0600 1/2/97, Fred M. Spinner wrote:
>I am unclear if an unmodified unit attached to a Yagi is still a part 15
>device or not? Doesn't part 15 have a EIRP limit? Or is it just the
>power output limit.

The Part 15 limit is 4 W EIRP. Anything that you do with output
power and antenna gain cannot exceed this value.

-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com  
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM  
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>  
Fax: (510) 770-9854 !  
~~~~~

7. Wavelan tcp/ip multipoint?

From: Jeff King <jeff@mich.com>
Date: Thu, 02 Jan 1997 14:53:45 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970102195345.006c2c10@mich.com>
Rendered body type: text/plain

Is anyone aware of any multipoint application/driver
software for the Wavelan? I believe they have a
wavepoint box for this purpose but would like to
see if they will work peer to peer. Linux and
Win95 are boxes of choice.

Thanks

-Jeff wb8wka

8. Re: [SS:773] Wavelan tcp/ip multipoint?

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Thu, 2 Jan 1997 16:36:24 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.970102163416.5491B-100000@uhf.wdc.net>
Rendered body type: text/plain

> Is anyone aware of any multipoint application/driver
> software for the Wavelan? I believe they have a
> wavepoint box for this purpose but would like to
> see if they will work peer to peer. Linux and
> Win95 are boxes of choice.
>

Hi Jeff:

What do you mean by multipoint? Wavelans emulate ethernet (assuming every station can hear every other station).

If you mean multicasting, both the FreeBSD and Linux drivers, as well as the Win95 DEC RoamAbout PCMCIA drivers support multicasting.

Regards,

Bernie

9. Re: [SS:773] Wavelan tcp/ip multipoint?

From: "Robert A. Buaas" <buaas@wireless.net>
Date: Thu, 2 Jan 1997 14:46:44 -0800 (PST)
To: ss@tapr.org
Cc: jeff@mich.com
Message-ID: <199701022246.0AA11477@wireless.net>
Rendered body type: text/plain

Jeff--

any of the drivers for UNIX (FreeBSD, Linux) boxes will work fine. The WaveLAN card looks like an Ethernet device, so it's naturally a multipoint device. I suppose you also could use a packet driver and NOS, if that better suits your fancy. I have drivers, if you're interested.

best regards/bob K6KGS

10. general question

From: Stan Scalsky <:sscalsk@mail.ameritel.net>
Date: Thu, 02 Jan 1997 17:57:53 +0500
To: ss@tapr.org
Message-ID: <2.2.16.19970102125753.3de7ac78@mail.ameritel.net>
Rendered body type: text/plain

In watching spread spectrum develop over the last months or so I notice that most everything takes place at higher and higher frequencies, some up in the GHz range. Does that mean that spread spectrum has no place below 30MHz? Are there operational spread spectrum systems below 30MHz?

-- stan

11. 2.4 GHz WaveLAN's

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Thu, 2 Jan 1997 15:31:12 -0800
To: ss@tapr.org
Message-ID: <v03010d08aef1f53ddd4c@[204.118.182.22]>
Rendered body type: text/plain

Speaking of WaveLAN's, has anyone out there experience with the 2.4 GHz WaveLAN ISA cards? I recently obtained a couple and wanted see if anyone had some experience before I started my testing.

Thanks,
-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com  
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM  
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>  
Fax: (510) 770-9854 !  
~~~~~

12. Re: [SS:766] Re: .. Process Gain

From: Phil Karn <karn@qualcomm.com>
Date: Thu, 2 Jan 1997 16:07:38 -0800 (PST)
To: djtk@tobit.co.uk

Cc: ss@tapr.org
Message-ID: <199701030007.QAA22189@servo.qualcomm.com>
Rendered body type: text/plain

>I suppose this is sort of related, but one of the things that I am
>confused about is practical freq reuse in DS system. Can you practically
>have n different 'channels' (with different spreading codes) centred on
>the same freq with the txcvrs in close proximity (assuming the
>powers/proximity is adjusted so that normal swamping doesn't occur).

This invokes the classic "near-far problem". If you have a bunch of transmitters all sending to the same receiver, you can do it as long as the signal levels are all matched at the receiver and you don't have too many transmitters sending at once.

The maximum number of transmitters you can support assuming perfect power control is equal to the process gain minus the required E_b/N_0 for each signal at the demodulator. E.g., if you have a process gain of 100 (20 dB) and the modulation & coding requires an E_b/N_0 of 5 dB, then you can support up to $20 - 5 = 15$ dB-users or 31.6 users. This ignores thermal noise, which reduces the capacity further. (You can model thermal noise as being equivalent to some number of non-revenue-paying users.)

Note that with a process gain of 100, you could have divided up your spectrum into 100 narrowband channels and supported 100 simultaneous users -- not 31.6. And if thermal noise is low, you could run with larger E_b/N_0 and achieve higher data rates. So in this particular situation, spread spectrum actually has *less* capacity than a conventional FDMA or TDMA narrowband scheme.

This is why you don't see spread spectrum being used in satellite TV broadcasting, for example.

Where spread spectrum has its advantage is in a geographical reuse situation, especially where there are many users each using a small and irregular fraction of the system capacity. Cellular telephony and wireless LANs are the classic examples. In these situations, the ability to geographically reuse spectrum more compactly, plus the lack of contention overhead of the sort you find in narrowband random access systems, tilts the balance in favor of spread spectrum.

Phil

13. Re: [SS:766] Re: .. Process Gain

From: Phil Karn <karn@qualcomm.com>
Date: Thu, 2 Jan 1997 15:56:04 -0800 (PST)
To: djk@tobit.co.uk
Cc: ss@tapr.org
Message-ID: <199701022356.PAA22168@servo.qualcomm.com>
Rendered body type: text/plain

>There was some talk awhile back about incorporating FEC into the spreading
>codes (as opposed to the data). Was this a wild idea (or my
>misunderstanding) or is it possible and what does it mean in terms of
>usefulness.

It's not clear to me what this means. Since the spreading codes are deterministic, i.e., they're already known in advance to the receiver, there's not much point in adding error correction to them.

In the sense that the error correction symbols are a pseudorandom (though deterministic) function of the data bits, I guess you could see them much like a spreading function. For example, a typical rate 1/2 convolutional code combined with a 128:1 PN spreading sequence could be represented by a low rate (1/256) convolutional code with some randomly chosen taps.

Phil

14. Re: [SS:773] Wavelan tcp/ip multipoint?

From: Jerry Normandin <jerryn@ici.net>
Date: Thu, 02 Jan 1997 19:48:53 -0500
To: ss@tapr.org
Message-ID: <32CC5775.1B45EAB8@ici.net>
Rendered body type: text/plain

Jeff King wrote:
>

> Is anyone aware of any multipoint application/driver
> software for the Wavelan? I believe they have a
> wavepoint box for this purpose but would like to
> see if they will work peer to peer. Linux and
> Win95 are boxes of choice.
>
> Thanks
>
> -Jeff wb8wka
Gee...

I am 100% multipoint. TCP/IP protocol does the trick plus
I use a wireless router protocol that manages mobile and fixed
router tables. Linux is the OS for the Router PERIOD! Windows95
is only adequate for the clients and is a poor OS to do any hopping
off of. I have several sites set up as routers. The traffic is
very similar to TCP/IP riding on top of 802.3

I don't have an AMATURE Radio license because of all the damn
restrictions the FCC and ARRL puts on you. But I am an avid hobbyist
and I am an engineer by trade. I get around the part 15 rules by
using a phase array antenna on my hop points and a parabolic dish
at the client sites. A mere 900mw of power can cover 23Miles like this!

15. Re: [SS:776] general question

From: Jerry Normandin <jerryn@ici.net>
Date: Thu, 02 Jan 1997 19:49:54 -0500
To: ss@tapr.org
Message-ID: <32CC57B2.F46CACB@ici.net>
Rendered body type: text/plain

Stan Scalsky wrote:

>
> In watching spread spectrum develop over the last months or so I notice that
> most everything takes place at higher and higher frequencies, some up in the
> GHz range. Does that mean that spread spectrum has no place below 30MHz? Are
> there operational spread spectrum systems below 30MHz?
>
> -= stan
Hey...

Spread Spectrum is alive and well @902-925Mhz

16. Re: [SS:781] Re: general question

From: George Cserenyi <zsolt@direct.ca>
Date: Thu, 2 Jan 1997 18:33:45 -0800 (PST)
To: Jerry Normandin <jerryn@ici.net>
Cc: ss@tapr.org
Message-ID: <Pine.LNX.3.91.970102183216.14214A-100000@boxer.direct.ca>
Rendered body type: text/plain

On Thu, 2 Jan 1997, Jerry Normandin wrote:

> Stan Scalsky wrote:
> >
> > In watching spread spectrum develop over the last months or so I notice that
> > most everything takes place at higher and higher frequencies, some up in the
> > GHz range. Does that mean that spread spectrum has no place below 30MHz? Are
> > there operational spread spectrum systems below 30MHz?

=====

> >
> > -= stan
> > Hey...
>
> Spread Spectrum is alive and well @902-925Mhz
>
Hey... how far below 30 MHz is 902-925Mhz?

17. Re: [SS:781] Re: general question

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Thu, 2 Jan 1997 19:47:48 -0600
To: ss@tapr.org
Message-ID: <v03007827aef2150954d7@[192.168.1.2]>
Rendered body type: text/plain

>Stan Scalsky wrote:

>>
>> In watching spread spectrum develop over the last months or so I notice that
>> most everything takes place at higher and higher frequencies, some up in the

>> GHz range. Does that mean that spread spectrum has no place below 30MHz? Are
>> there operational spread spectrum systems below 30MHz?
>>
>> -- stan

Hi Stan.

The answer is yes.

The military has been operating systems for a long time (years) below 30Mhz. In addition AMRAD and some unsaid govt group had a system below 30Mhz back in the early 80's when they were doing the other SS technology work. Nothing was ever published on the HF stuff. Only stores I here told by those involved.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

18. Re: [SS:775] Re: Wavelan tcp/ip multipoint?

From: "David A. Wright" <kd6buy@netcom.com>
Date: Thu, 02 Jan 1997 23:08:48 -0800
To: ss@tapr.org
Message-ID: <3.0.32.19970102230836.00697be8@netcom16.netcom.com>
Rendered body type: text/plain

I'm hoping you can help me...

I have two Free Wave radios, and would like to use NT Server 4.0 to route from an ethernet network, to the Free Wave network. On the other end I'm trying to set up Windows 95 to the Free Wave network.

Question: Do you think this is possible?

I don't want to use dial up networking, I'd like the client to have a full time connection for IP traffic to initiate the connection, to and from the ethernet network.

If you can't help, do you know anyone doing this? or someone else who can help? I'm new to the list, do you think this would be an appropriate post to the group? Is another list discussing this?

Thank you for your time.

All help will be greatly appreciated!

-Dave

At 04:48 PM 1/2/97 -0600, you wrote:

Jeff--

any of the drivers for UNIX (FreeBSD, Linux) boxes will work fine. The WaveLAN card looks like an Ethernet device, so it's naturally a multipoint device. I suppose you also could use a packet driver and NOS, if that better suits your fancy. I have drivers, if you're interested.

best regards/bob K6KGS

19. Re: [SS:783] Re: general question

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Fri, 3 Jan 1997 09:00:09 -0500
To: ss@tapr.org
Message-ID: <199701031400.JAA11416@Paris.GASD102designcenter>
Rendered body type: text/plain

> From ss@tapr.org Thu Jan 2 22:13:55 1997
> Date: Thu, 2 Jan 1997 19:55:07 -0600 (CST)
> Originator: ss@tapr.org
> From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
> To: ss@tapr.org
> Subject: [SS:783] Re: general question
> X-Listprocessor-Version: 6.0 -- ListProcessor by Anastasios Kotsikonas
> X-Comment: Tucson Amateur Packet Radio Spread Spectrum
>
> >Stan Scalsky wrote:
> >>


```

> > In watching spread spectrum develop over the last months or so I notice that
> > most everything takes place at higher and higher frequencies, some up in the
> > GHz range. Does that mean that spread spectrum has no place below 30MHz? Are
> > there operational spread spectrum systems below 30MHz?
> >
> > == stan
>
> Hi Stan.
>
> The answer is yes.
>
> The military has been operating systems for a long time (years) below
> 30Mhz. In addition AMRAD and some unsaid govt group had a system below
> 30Mhz back in the early 80's when they were doing the other SS technology
> work. Nothing was ever published on the HF stuff. Only stores I here told
> by those involved.
>
> Cheers - Greg
>

```

What was the 'other SS technology work?' And what are these stories you have heard? Inquiring minds want to know 8>)

73s Tony

20. Re: [SS:782] Re: general question

From: Jerry Normandin <jerryn@ici.net>
 Date: Fri, 03 Jan 1997 09:07:42 -0500
 To: ss@tapr.org
 Message-ID: <32CD12AE.167EB0E7@ici.net>
 Rendered body type: text/plain

George Cserenyi wrote:

```

>
> On Thu, 2 Jan 1997, Jerry Normandin wrote:
>
> > Stan Scalsky wrote:
> >
> > > In watching spread spectrum develop over the last months or so I notice that
> > > most everything takes place at higher and higher frequencies, some up in the
> > > GHz range. Does that mean that spread spectrum has no place below 30MHz? Are
> > > there operational spread spectrum systems below 30MHz?
> > >
> > > =====
> > >
> > > == stan
> > > Hey...
> >
> > Spread Spectrum is alive and well @902-925Mhz
> >
> Hey... how far below 30 MHz is 902-925Mhz?

```

Jerry Replied,

Man I must not be getting enough sleep! I thought you said 30Ghz!

Man you must get terrible bit transfer rates at 30Mhz or below!
 I prefer averaging at least 1.6Mbs!!!

I can't live with 300cps. No way!
 Jerry Normandin, iCi Sr. Systems Engineer
 Tel.(508)261-0383 x1118
 "I'm not only an iCi Staff member, I'm
 also a client!"

21. Re: [SS:784] Re: Wavelan tcp/ip multipoint?

From: Jerry Normandin <jerryn@ici.net>
 Date: Fri, 03 Jan 1997 09:08:40 -0500
 To: ss@tapr.org
 Message-ID: <32CD12E8.2781E494@ici.net>
 Rendered body type: text/plain

David A. Wright wrote:

```

>
> I'm hoping you can help me...
> I have two Free Wave radios, and would like to use NT Server 4.0
> to route from an ethernet network, to the Free Wave network.
> On the other end I'm trying to set up Windows 95 to the Free
> Wave network.

```

> Question: Do you think this is possible?
> I don't want to use dial up networking, I'd like the client to
> have a full time connection for IP traffic to initiate the
> connection, to and from the ethernet network.
>
> If you can't help, do you know anyone doing this? or someone
> else who can help? I'm new to the list, do you think this
> would be an appropriate post to the group? Is another list
> discussing this?
>
> Thank you for your time.
> All help will be greatly appreciated!
> -Dave
>
> At 04:48 PM 1/2/97 -0600, you wrote:
> Jeff--
>
> any of the drivers for UNIX (FreeBSD, Linux) boxes will work fine.
> The WaveLAN card looks like an Ethernet device, so it's naturally
> a multipoint device. I suppose you also could use a packet driver
> and NOS, if that better suits your fancy. I have drivers, if you're
> interested.
>
> best regards/bob K6KGS
You are better off using Linux! Many HAMS are doing this with Linux and
the code is available on the net.
--
Jerry Normandin, iCi Sr. Systems Engineer
Tel.(508)261-0383 x1118
"I'm not only an iCi Staff member, I'm
also a client!"

22. Re: [SS:784] Re: Wavelan tcp/ip multipoint?

From: Steve Stroh <strohs@halcyon.com>
Date: Fri, 3 Jan 1997 07:49:00 -0800 (PST)
To: TAPR Spread Spectrum SIG Mailing List <ss@tapr.org>,
TAPR SS STA Mailing List <ss-sta@tapr.org>
Message-ID: <Pine.ULT.3.95.970103074317.19564C-100000@chinook.halcyon.com>
Rendered body type: text/plain
On Fri, 3 Jan 1997, David A. Wright wrote:

> I'm hoping you can help me...
> I have two Free Wave radios, and would like to use NT Server 4.0
> to route from an ethernet network, to the Free Wave network.
> On the other end I'm trying to set up Windows 95 to the Free
> Wave network.
> Question: Do you think this is possible?
> I don't want to use dial up networking, I'd like the client to
> have a full time connection for IP traffic to initiate the
> connection, to and from the ethernet network.

I don't understand your reluctance to use dial-up networking. Since the
FreeWave's are PPP-only devices, that's really your only choice. NT (I've
no experience yet with 4.0) understands modems, but I don't think
understands SLIP/PPP direct connections. Using dial-up networking should
achieve what you want- the connection should establish dynamically based
on the presence of data. For instance, if on the W95 client you start up
a Web browser with a remote home page, that should trigger the dial up
networking to automatically initiate the dial-up connection.

This is probably better discussed on the ss-sta list, since it deals
specifically with issues involved in the STA, including use of the
FreeWave units.

--
Steve Stroh Woodinville, Washington, USA strohs@halcyon.com

23. Re: [SS:784] Re: Wavelan tcp/ip multipoint?

From: Bob Stricklin <bstrick@dallas.net>
Date: Fri, 03 Jan 1997 10:11:04 -0600
To: ss@tapr.org
Message-ID: <2.2.32.19970103161104.0030819c@plano.net>
Rendered body type: text/plain
I too am using Win NT40 Server. Microsoft's implementation of TCPIP is not
complete and does not include SLIP connections.

You may want to set up a second UNIX based computer and network this

computer with NT40. Then you can work with a more robust implementation of TCP/IP. This will give you another complete set of problems as you can see from questions that have been asked and problems people are having getting this set up. It will work though. You may use Linux or if it is non-commercial go get the \$20 copy (CD) of SCO (See: www.sco.com).

You may also be able to get it to work with NT40 and a ISDN modem. I have not looked into this myself but it may be worth pursuing. If you are a C++ programmer Microsoft offers enough info on their development CDs to modify the port drivers. This will be a lot of effort also unless you already are working with the development systems.

At 01:07 AM 1/3/97 -0600, you wrote:

>I'm hoping you can help me...

>I have two Free Wave radios, and would like to use NT Server 4.0

>to route from an ethernet network, to the Free Wave network.

>On the other end I'm trying to set up Windows 95 to the Free

>Wave network.

>Question: Do you think this is possible?

>I don't want to use dial up networking, I'd like the client to

>have a full time connection for IP traffic to initiate the

>connection, to and from the ethernet network.

>

>If you can't help, do you know anyone doing this? or someone

>else who can help? I'm new to the list, do you think this

>would be an appropriate post to the group? Is another list

>discussing this?

>

>Thank you for your time.

>All help will be greatly appreciated!

>-Dave

>

>At 04:48 PM 1/2/97 -0600, you wrote:

>Jeff--

>

>any of the drivers for UNIX (FreeBSD, Linux) boxes will work fine.

>The WaveLAN card looks like an Ethernet device, so it's naturally

>a multipoint device. I suppose you also could use a packet driver

>and NOS, if that better suits your fancy. I have drivers, if you're

>interested.

>

>best regards/bob K6KGS

>

>

>

>

Bob Stricklin, N5BRG

bstrick@dallas.net AKA: bstrick@plano.net bstrick@tenet.edu

Dallas, Texas

24. Re: [SS:786] Re: general question

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>

Date: Fri, 3 Jan 1997 11:41:52 -0600

To: ss@tapr.org

Message-ID: <v03007805aef2f4a19e90@[192.168.1.2]>

Rendered body type: text/plain

>> > -= stan

>> > Hey...

>> >

>> > Spread Spectrum is alive and well @902-925Mhz

>> >

>> > Hey... how far below 30 MHz is 902-925Mhz?

>> >

>Jerry Replied,

>

>Man I must not be getting enough sleep! I thought you said 30Ghz!

>

>Man you must get terrible bit transfer rates at 30Mhz or below!

>I prefer averaging at least 1.6Mbs!!!

>

As has been discussed over on the HF SIG, there is a lot of interest by someone to implementing SS on HF bands. There are already systems there doing it and the possibility of being able to deliver say 9600bps or a little faster in order to do CD quality audio for communications or even

that kind of data transfer is very exciting.

Plus you have other issues of interest, ALE possibilities if it is a hybrid, multi-path issue, etc.

If anyone is interested, you should pop over on the FTP site and grab the mail archives from the last 6 months and scan them. Phil and others had some very good discussion on what the goal and implementation might be.

I think the eventual goal is to get SS rules adopted on HF as well as 50Mhz and above. Just one battle at a time please.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

25. Re: [SS:788] Re: Wavelan tcp/ip multipoint?

From: "Glenn S. Tenney K0TJ" <tenney@think.org>
Date: Fri, 3 Jan 1997 09:35:55 -0700
To: ss@tapr.org
Message-ID: <v03010902aef2e59466a4@[206.14.123.131]>
Rendered body type: text/plain

At 8:53 AM -0700 1/3/97, Steve Stroh wrote:
>I don't understand your reluctance to use dial-up networking. Since the
>FreeWave's are PPP-only devices, that's really your only choice.

Say what? The FreeWaves look like a null modem cable so you can run anything you want with them. I've used PPP and SLIP as well as vt100 to vt100...

Glenn Tenney K0TJ Fantasia Systems Inc.
tenney@think.org Amateur radio: AA6ER
Voice: (415) 574-3420 Fax: (415) 574-0546

26. Group Purchase on 900Mhz FHSS systems.

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Fri, 3 Jan 1997 14:12:19 -0600
To: " Spread Spectrum " <ss@tapr.org>
Message-ID: <v03007811aef315023c54@[192.168.1.2]>
Rendered body type: text/plain

I have had several e-mails about the change in the Freewave radio group purchase page that took place last night.

TAPR posted the page last Thursday and on Tuesday the president of Freewave had several issues regarding certain information that was being provided on the page. I updated the page on Tuesday night, but on Thur Freewave wanted to have some additional wording and information changed.

Dewayne and myself decided to just pull the page for the weekend so that we would have enough time to make sure Freewave and TAPR was happy with the final page. The updated page, which everyone will have signed off on, will be back online first of next week.

Dorothy is still taking orders submitted from the on-line order form and via phone. Plans are still to place the first order at the end of January and we already have some 50+ orders in the system for an end of January purchase (in less than 7 days!). The first 65 radios, which is part of the beta usage purchase (work out the kinks in ordering with Freewave, writing usage docs, etc) should be arriving sometime middle of January.

If you think the purchase is going to fold because the information on the page is off-line, no worries, it isn't. We are just making sure we have a smooth working relationship with the mfg.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

27. fwd: [SS:790] Re: general question

From: ostgate!OSTGATE!SADOWSKI@uunet.uu.net (Sam Adowski), (Greg Jones)
Date: 03-Jan-97 16:50:00 -0300
To: ss@tapr.org, uunet!tapr.org!ss@uunet.uu.net
Message-ID: 4338CD32816767E1
Rendered body type: text/plain

===== Original Message =====

>> > > -= stan
>> > Hey...
>> >
>> > Spread Spectrum is alive and well @902-925Mhz
>> >
>> Hey... how far below 30 MHz is 902-925Mhz?
>
>Jerry Replied,
>
>Man I must not be getting enough sleep! I thought you said 30Ghz!
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>Man you must get terrible bit transfer rates at 30Mhz or below!
>I prefer averaging at least 1.6Mbs!!!
>

As has been discussed over on the HF SIG, there is a lot of interest by someone to implementing SS on HF bands. There are already systems there doing it and the possibility of being able to deliver say 9600bps or a little faster in order to do CD quality audio for communications or even that kind of data transfer is very exciting.

Plus you have other issues of interest, ALE possibilites if it is a hybrid, multi-path issue, etc.

If anyone is interested, you should pop over on the FTP site and grab the mail archives from the last 6 months and scan them. Phil and others had some very good discussion on what the goal and implementation might be.

I think the eventual goal is to get SS rules adopted on HF as well as 50Mhz and above. Just one battle at a time please.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

===== Fwd by: Sam Adowski =====

I sure hope this gets to the right SIG...

Lots of comments about Spread Spectrum at HF freqs the past few days... Well... over 130 pages of historical information (much of it at HF freqs) in the McGraw-Hill book entitled:

Spread Spectrum Communications Handbook revised edition

By: Simon, Omura, Scholtz, and Levitt.... a total of over 1200 pages on the subject and a good learning tool about not just the history - - but much of the technology, metrics, math, pitfalls - - etc..... I highly recommend it....

not cheap however....

Aloha

Al AH6LS
sadowski@ostgate.com

28. Re: [SS:790] Re: general question

From: "Steve Sampson" <ssampson@oklahoma.net>
Date: Fri, 3 Jan 1997 16:02:32 -0600
To: <ss@tapr.org>
Message-ID: <199701032210.QAA14417@dns.okc>
Rendered body type: text/plain

> I think the eventual goal is to get SS rules adopted on HF as well as 50Mhz
> and above. Just one battle at a time please.

>
> Cheers - Greg

People often say that the military uses SS on HF. I was mostly in Tactical, and Air Combat Commands, but if it's any consolation, the front line does not use SS on HF. Mostly they rely on Tadil-A on HF (Data link, one master, many slaves exchanging track symbology) with the Navy. Where SS has been blown out is in UHF and above. Most airborne units use the L-Band Hybrid SS JTIDS, and/or the Have Quick FHSS UHF radios.

Just an aside, the E-3 uses only an L-Band Horn in the nose and tail to transmit JTIDS data. During most wars we linked up all E-3's this way. In the Iraq war we linked up the 3 orbits (NW Saudi, Central Saudi, Gulf Saudi). There is only one Vocoder on E-3's (back then, don't know about now) so we shared it. But it was commonly used as the Intel net where the RC-135 guys could coordinate with their cohorts on the E-3, and correlate emitters the another RC-135 on station.

Only now are they looking at protocols that could allow something more than radar scope symbology (tracks, circles, points, etc).

I don't think the troops in the field have seen HF SS, and it is mostly used at command or research levels still. The military is not at a much higher technology level than Amateurs. The problem with Amateurs is, they dink around with too many modes. Slow Scan, AM, FM, FSK, etc, etc. It's just a mess for a FH system to hop around in :-). I think some of the early Ham tests with Slow Hoppers turned out to be unusable.

Steve

29. RE: 782] Re: general question

From: Ralph Ward <rw@txcc.net>
Date: Fri, 3 Jan 1997 19:07:06 -0600
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BBF9AA.E3F28920@buroak>
Rendered body type: text/plain

didn't I read somewhere that it just loops around like a good scroll bar? fall off one end and you reach the other?

From: George Cserenyi[SMTP:zsolt@direct.ca]
Sent: Thursday, January 02, 1997 1:41 PM
To: ss@tapr.org
Subject: [SS:782] Re: general question

On Thu, 2 Jan 1997, Jerry Normandin wrote:

> Stan Scalsky wrote:
> >
> > In watching spread spectrum develop over the last months or so I notice that
> > most everything takes place at higher and higher frequencies, some up in the
> > GHz range. Does that mean that spread spectrum has no place below 30MHz? Are
> > there operational spread spectrum systems below 30MHz?
=====

> >
> > -= stan
> Hey...
>
> Spread Spectrum is alive and well @902-925Mhz
>
> Hey... how far below 30 MHz is 902-925Mhz?

30. Re: [SS:794] Re: general question

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Fri, 3 Jan 1997 22:03:52 -0600
To: ss@tapr.org
Message-ID: <v03007805aef386b6fb56@[192.168.1.2]>
Rendered body type: text/plain

I think you should make your remark over on the HF SIG. I think you will get a much more detailed response since there are several on that list that have direct military background in the HF area.

>From what I have read, there are HF SS systems that are used pretty close to front lines...not sure about people walking around with uints in backpacks, but communications vans that provide battle ground

communications.

Cheers - Greg

>> I think the eventual goal is to get SS rules adopted on HF as well as 50Mhz
>> and above. Just one battle at a time please.
>>
>> Cheers - Greg
>
>People often say that the military uses SS on HF. I was mostly in Tactical,
>and Air Combat Commands, but if it's any consolation, the front line does not
>use SS on HF. Mostly they rely on Tadi-A on HF (Data link, one master, many
>slaves exchanging track symbology) with the Navy. Where SS has been blown
>out is in UHF and above. Most airborne units use the L-Band Hybrid SS JTIDS,
>and/or the Have Quick FHSS UHF radios.
>
>Just an aside, the E-3 uses only an L-Band Horn in the nose and tail to
>transmit
>JTIDS data. During most wars we linked up all E-3's this way. In the
>Iraq war we
>linked up the 3 orbits (NW Saudi, Central Saudi, Gulf Saudi). There is
>only one
>Vocoder on E-3's (back then, don't know about now) so we shared it. But
>it was
>commonly used as the Intel net where the RC-135 guys could coordinate with
>their cohorts on the E-3, and correlate emitters the another RC-135 on station.
>
>Only now are they looking at protocols that could allow something more than
>radar scope symbology (tracks, circles, points, etc).
>
>I don't think the troops in the field have seen HF SS, and it is mostly
>used at
>command or research levels still. The military is not at a much higher
>technology
>level than Amateurs. The problem with Amateurs is, they dink around with
>too many modes. Slow Scan, AM, FM, FSK, etc, etc. It's just a mess for a
>FH system to hop around in :-)) I think some of the early Ham tests with Slow
>Hoppers turned out to be unusable.
>
>Steve

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

31. SS on UHF

From: Eduardo Martínez <ea4axu@ea4rct.ampr.org>
Date: Sat, 04 Jan 1997 15:33:53 +0100
To: ss@tapr.org
Message-ID: <3.0.32.19970104153321.007b4ab0@ec4dfp.ampr.org>
Rendered body type: text/plain

¡Hola chicos!

Since the 900 MHz band is not usable here in EA, and the 2'4 GHz band seems to be too complicated to establish visual links in Madrid, do you know if there any "plug 'n play" or easy at least equipment/project to work on UHF??.

And another question, this may be more "comercial". Can you point me to the *cheapest* way of linking a 10 Km visual line at + 64Kbps ?

That's all for now. Meanwhile I'll be learning as much as I can about SS :-)

SaludoX de Eduardo

Eduardo Martínez 2:341/34.3	[Fido]	W.W.-TaXiFoBIa-NeT-H.Q.
emartine@tsai.es	[Inet]	ec4dfp.ampr.org [44.133.28.122]
ea4axu@ea4rct.ampr.org	[Inet/HAM]	ea4axu.ampr.org [44.133.28.133]

32. Re: [SS:796] Re: general question

From: doug cole <dcole@on-ramp.ior.com>
Date: Sat, 04 Jan 1997 11:18:41 -0800
To: ss@tapr.org
Message-ID: <1.5.4.16.19970104191841.0b9739c2@on-ramp.ior.com>

You are better off running Linux! I run wireless router code from
M.I.T. AND IT'S FREE!!!!!!!!!!!!!!!!!!!!!!

Linux Rules! Microsoft Drooles!

34. FreeWave and NT (was Re: Wavelan tcp/ip multipoint?)

From: Steve Stroh <strohs@halcyon.com>
Date: Sat, 4 Jan 1997 16:36:57 -0800 (PST)
To: TAPR Spread Spectrum SIG Mailing List <ss@tapr.org>,
TAPR SS STA Mailing List <ss-sta@tapr.org>
Message-ID: <Pine.ULT.3.95.970104163305.5289A-100000@coho.halcyon.com>
Rendered body type: text/plain

On Fri, 3 Jan 1997, Glenn S. Tenney KOTJ wrote:

> At 8:53 AM -0700 1/3/97, Steve Stroh wrote:
> >I don't understand your reluctance to use dial-up networking. Since the
> >FreeWave's are PPP-only devices, that's really your only choice.
>
> Say what? The FreeWaves look like a null modem cable so you can run
> anything you want with them. I've used PPP and SLIP as well as vt100 to
> vt100...

Duh... Glen is right, of course. The only defense I can muster was that
I was probably thinking of the Metricom Ricochet modems, and THOSE are PPP
devices.

Steve N8GNJ

--

Steve Stroh Woodinville, Washington, USA strohs@halcyon.com

35. Re: [SS:789] Re: Wavelan tcp/ip multipoint?

From: Jerry Normandin <jerryn@ici.net>
Date: Mon, 06 Jan 1997 11:32:55 -0500
To: ss@tapr.org
Message-ID: <32D12937.794BDF32@ici.net>
Rendered body type: text/plain

Bob Stricklin wrote:

>
> I too am using Win NT40 Server. Microsoft's implementation of TCPIP is not
> complete and does not include SLIP connections.
>
> You may want to set up a second UNIX based computer and network this
> computer with NT40. Then you can work with a more robust implementation of
> TCPIP. This will give you another complete set of problems as you can see
> from questions that have been ask and problems people or having getting this
> set up. It will work though. You may use Linux or if it is non commercial go
> get the \$20 copy (CD) of SCO (See: www.sco.com).
>
> You may also be able to get it to work with NT40 and a ISDN modem. I have
> not looked into this myself but it may be worth pursuing. If you are a C++
> programmer Microsoft offers enough info on there development CDs to modify
> the port drivers. This will be a lot of effort also unless you already are
> working with the development systems.
>
> At 01:07 AM 1/3/97 -0600, you wrote:
> >I'm hoping you can help me...
> >I have two Free Wave radios, and would like to use NT Server 4.0
> >to route from an ethernet network, to the Free Wave network.
> >On the other end I'm trying to set up Windows 95 to the Free
> >Wave network.
> >Question: Do you think this is possible?
> >I don't want to use dial up networking, I'd like the client to
> >have a full time connection for IP traffic to initiate the
> >connection, to and from the ethernet network.
> >
> >If you can't help, do you know anyone doing this? or someone
> >else who can help? I'm new to the list, do you think this
> >would be an appropriate post to the group? Is another list
> >discussing this?
> >
> >Thank you for your time.
> >All help will be greatly appreciated!
> >-Dave
> >
> >At 04:48 PM 1/2/97 -0600, you wrote:
> >Jeff--

```

> >
> >any of the drivers for UNIX (FreeBSD, Linux) boxes will work fine.
> >The WaveLAN card looks like an Ethernet device, so it's naturally
> >a multipoint device. I suppose you also could use a packet driver
> >and NOS, if that better suits your fancy. I have drivers, if you're
> >interested.
> >
> >best regards/bob K6KGS
> >
> >
> >
> >
>
> Bob Stricklin, N5BRG
> bstrick@dallas.net AKA: bstrick@plano.net bstrick@tenet.edu
> Dallas, Texas
When are you people going to learn? Microsoft Operating Systems are
lame. Products like Linux and FreeBSD give the power back to us
sexperimenters! Linux especially has many wireless router drivers
available. MobileIP is available from M.I.T. and is called linux
Linux-MobileIP. I'd post it here but last time I attached
code I got chewed out by the moderator. So people point your browser to
your favorite search engine and search for Linux-MobileIP.

Linux Rules! Microsoft Drooles!
--
Jerry Normandin, iCi Sr. Systems Engineer
Tel.(508)261-0383 x1118
"I'm not only an iCi Staff member, I'm
also a client!"

```

36. Re: [SS:788] Re: Wavelan tcp/ip multipoint?

```

From: marius@krepro.no (Marius Hauki)
Date: Mon, 6 Jan 1997 21:10:29 +0100 (MET)
To: ss@tapr.org
Message-ID: <199701062010.VAA01424@mail1.sn.no>
Rendered body type: text/plain

>
>On Fri, 3 Jan 1997, David A. Wright wrote:
>
>> I'm hoping you can help me...
>> I have two Free Wave radios, and would like to use NT Server 4.0
>> to route from an ethernet network, to the Free Wave network.
>> On the other end I'm trying to set up Windows 95 to the Free
>> Wave network.
>> Question: Do you think this is possible?
>> I don't want to use dial up networking, I'd like the client to
>> have a full time connection for IP traffic to initiate the
>> connection, to and from the ethernet network.
>
>I don't understand your reluctance to use dial-up networking. Since the
>FreeWave's are PPP-only devices, that's really your only choice. NT (I've
>no experience yet with 4.0) understands modems, but I don't think
>understands SLIP/PPP direct connections. Using dial-up networking should
>achieve what you want- the connection should establish dynamically based
>on the presence of data. For instance, if on the W95 client you start up
>a Web browser with a remote home page, that should trigger the dial up
>networking to automatically initiate the dial-up connection.
>
>This is probably better discussed on the ss-sta list, since it deals
>specifically with issues involved in the STA, including use of the
>FreeWave units.
>
>--
>Steve Stroh Woodinville, Washington, USA strohs@halcyon.com
>

It is fully possible to use NT4.0 with Point To Point Tunneling Protocol
(PPP) and
also SLIP.

You must make a pre / postconnect script and supply the system
either automatically or manually with the IP address.
This depends on if the system you are connecting to uses dynamic
or static IP allocation.

I use NT4.0 to connect to my internet service provider via PPP.. No problem.
I then assume you could make it work with your Free Wave radios.

```

Best regards
Marius Hauki
LA9EEA

marius@krepro.no

>
>
Marius Hauki
Product Manager CAD/CAM systems
Krepro AS

Krepro's main office :
=====
Krepro AS, PO. box 233
Boensdalsvegen 32
N-2070 Raaholt
Norway
Tel. : ++47 63 95 20 00
Fax. : ++47 63 95 20 50
E-mail : office@krepro.no
WEB page : in planning phase

My office at Hoevik :
=====
Tel : ++47 67 12 59 15
Fax: ++47 67 12 59 96
Modem (HST) : ++47 67 12 59 96
E-mail : marius@krepro.no

Note :
=====
USE MAIN OFFICE FAX AND TELEPHONE UNLESS OTHERWISE SPECIFIED
FOR E-MAIL -- RETURN TO THE SAME E-MAIL ADDRESS THE MESSAGE IS SENT FROM
ALWAYS INCLUDE OUR REFERENCES IN HEADER OR IN BODY OF MESSAGE
FOR IDENTIFICATION PURPOSES-- MAIN OFFICE E-MAIL ADDRESS IS NOW IN SERVICE:
office@krepro.no -- ALL TECHNICAL ISSUES AND TECHNICAL SUPPORT SHALL BE
SENT TO marius@krepro.no -- ALL CORRESPONDANCE ADDRESSED TO MARIUS
HAUKI SHALL BE SENT TO : marius@krepro.no

37. RE: 794] Re: general question

From: Gwyn Reedy <gwyn@paccomm.com>
Date: Tue, 7 Jan 1997 08:29:23 -0500
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BBFC74.E3CBA2C0@gwyn>
Rendered body type: text/plain

What about the tens of thousands of Singcars radios the Army has bought? SS from 30 MHz to 80 MNz or something like that. Not quite HF, but significant numbers of them.

Gwyn

From: Steve Sampson[SMTP:ssampson@oklahoma.net]
Sent: Friday, January 03, 1997 11:10 AM
To: ss@tapr.org
Subject: [SS:794] Re: general question

> I think the eventual goal is to get SS rules adopted on HF as well as 50Mhz
> and above. Just one battle at a time please.
>
> Cheers - Greg

People often say that the military uses SS on HF. I was mostly in Tactical, and Air Combat Commands, but if it's any consolation, the front line does not use SS on HF. Mostly they rely on Tadi-A on HF (Data link, one master, many slaves exchanging track symbology) with the Navy. Where SS has been blown out is in UHF and above. Most airborne units use the L-Band Hybrid SS JTIDS, and/or the Have Quick FHSS UHF radios.

Just an aside, the E-3 uses only an L-Band Horn in the nose and tail to transmit JTIDS data. During most wars we linked up all E-3's this way. In the Iraq war we linked up the 3 orbits (NW Saudi, Central Saudi, Gulf Saudi). There is only one

Vocoder on E-3's (back then, don't know about now) so we shared it. But it was commonly used as the Intel net where the RC-135 guys could coordinate with their cohorts on the E-3, and correlate emitters the another RC-135 on station.

Only now are they looking at protocols that could allow something more than radar scope symbolgy (tracks, circles, points, etc).

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Steve

38. AX.25 etc. in Linux Journal

From: Richard Parry <rparry@qualcomm.com>
Date: Tue, 7 Jan 1997 07:34:02 -0800
To: ss@tapr.org
Message-ID: <v03007805aef81ccd25a1@[129.46.159.136]>
Rendered body type: text/plain

I thought the recent article, "NF Observatory Networking with Linux OS" in February 97, Linux Journal, Issue #34, would be of interest to Linux (Spread Spectrum) hams here on the mailing list. The article is supposed to be about the network used to control an optical telescope in New Mexico, but since most of it is done via amateur packet radio, I think that many of the readers of this list will find it interesting. Besides a 440MHz link, the system uses a Wavlan Spread Spectrum system for high speed communication.

While I enjoyed the article, I am surprised it was published since it has virtually no relevance outside of the HR environment. I am not complaining, just surprised.

Richard Parry, P.E., W9IF - Ext 8-4972, Office R-307B
Qualcomm, Inc. Globalstar/Gateway Reverse Link
Intranet --> <http://web/~rparry>
Internet --> <http://www.qualcomm.com/~rparry>
AX.25 --> W9IF@K6JCC.#SOCAL.CA.USA.NOAM

39. Re: [SS:803] RE: 794] Re: general question

From: Steve Sampson <ssampson@claven.tinker.af.mil>
Date: Tue, 07 Jan 1997 13:20:30 -0600
To: ss@tapr.org
Message-ID: <32D2A1FE.41C6@eds.tinker.af.mil>
Rendered body type: text/plain

Gwyn Reedy wrote:

>
> What about the tens of thousands of Singcars radios the Army has bought?
> SS from 30 MHz to 80 MNz or something like that. Not quite HF, but
> significant numbers of them.

Another good band. Much better than HF. I think the Army does Singcars like the USAF does Have-Quick.

Steve

40. RE: 804] AX.25 etc. in Linux Journal

From: "Bloom, Jon, KE3Z" <jbloom@arrl.org>
Date: Tue, 7 Jan 1997 14:36:00 -0500
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <m0vhhL0-0004oRC@mgate.arrl.org>
Rendered body type: text/plain

Maybe it got published because the publisher of LJ, Phil Hughes, is a ham. :-)

Jon

> While I enjoyed the article, I am surprised it was published since
it

> has virtually no relevance outside of the HR environment. I am not
> complaining, just surprised.

41. FreeWave

From: Tony McConnell <n3jly@erols.com>
Date: Sat, 11 Jan 1997 01:15:27 -0500
To: ss@tapr.org
Message-ID: <199701110615.BAA31252@mx01.erols.com>
Rendered body type: text/plain

Hello,

I've gotten ready to buy the radios (freewave 115).

I was visiting the freewave site and saw something I hadn't noticed before, that the units are 115Kb FULL duplex. Not a minor difference. I also noticed the mention of a 115 and a 115H. Whats the difference? Is the 115 400mW and the 115H 1W? Both models were at the top of the same spec sheet, I didn't notice any differentiation.

But I saw the post last week about discussions with the vendor. And that the offer is no longer mentioned on the TAPR web site. Is there a problem?

Tony McConnell N3JLI
n3jly@erols.com

42. Re: [SS:807] FreeWave

From: Kevin Jessup <kevin.jessup@mail.mei.com>
Date: Sat, 11 Jan 1997 07:43:45 -0600
To: ss@tapr.org
Message-ID: <01IE2UR3RF2A8XYPH3@meipws.mis.mei.com>
Rendered body type: text/plain

At 12:21 AM 1/11/97 -0600,
Tony McConnell <n3jly@erols.com> wrote:

>And that the offer is no longer mentioned on the TAPR web site. Is there
>a problem?

I noticed this too. I recall an earlier TAPR web page stating their new FreeWave page would be up soon. (I believe they mentioned January 7th.) But now I see no mention of the FreeWave deal anywhere.

Kevin, n9sqb

43. Re: [SS:808] Re: FreeWave

From: jrc@brainiac.mn.org (Jeffrey Comstock)
Date: Sat, 11 Jan 1997 09:02:00 -0600 (CST)
To: ss@tapr.org
Message-ID: <9701111502.AA15644@brainiac.mn.org>
Rendered body type: text/plain

>
> At 12:21 AM 1/11/97 -0600,
> Tony McConnell <n3jly@erols.com> wrote:
>
> >And that the offer is no longer mentioned on the TAPR web site. Is there
> >a problem?
>
> I noticed this too. I recall an earlier TAPR web page
> stating their new FreeWave page would be up soon. (I
> believe they mentioned January 7th.) But now I see no
> mention of the FreeWave deal anywhere.

I called the TAPR office yesterday (01/10) about the FreeWave radios, and the deal is still on. Dorothy said the order will be made toward the end of the month. She also stated the WWW page would be up soon, and told me to check there for more info.

--
Jeffrey Comstock
INET: jrc@brainiac.mn.org
WEB: <http://www.skypoint.net/members/jrc/>
CW: -. -. ----- -..

44. RE: 809] Re: FreeWave

From: Phillip Wymer Via Packet <ka8pog@bbs.ka8pog.ampr.org>
Date: Sat, 11 Jan 1997 10:57:12 -0500

To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BBFFAE.37FF6F20@pog133.ka8pog.ampr.org>
Rendered body type: text/plain

I also Talked to Dorthy on the 10th of January and was told the same thing.
but am not sure of the model that will be shipped to us im hoping it is the 1 watt
version. Does anyone know exactly what version they are going to ship?

45. Re: [SS:810] RE: 809] Re: FreeWave

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Sat, 11 Jan 1997 11:34:03 -0800
To: ss@tapr.org
Message-ID: <v03010d04aefd9b97c4ee@[192.160.122.32]>
Rendered body type: text/plain

At 10:00 AM -0600 1/11/97, Phillip Wymer Via Packet wrote:
>I also Talked to Dorthy on the 10th of January and was told the same thing.
>but am not sure of the model that will be shipped to us im hoping it is
>the 1 watt
>version. Does anyone know exactly what version they are going to ship?

Be assured. It will be the 1 watt model.

-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com  
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM  
Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>  
Fax: (510) 770-9854 !  
~~~~~

46. RE: 811] RE: 809] Re: FreeWave

From: Jon Andrews <jandrews@i-2000.com>
Date: Sat, 11 Jan 1997 22:11:55 -0500
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BC0010.BD87C680@selden30.access1.dh.i-2000.net>
Rendered body type: text/plain

Hello All!

I have just been on this SIG for about a week. I read back in the archives
and looked for more info on the FreeWave. I found only bits & pieces in
the mail archives and nothing on the web site.

Are these "radio MODEMS" operating spread spectrum on the 900MHz band? It
sounds real interesting, I have been looking for such a item (reasonably)
priced for some time. Could someone steer me to a web site or sometime
where I could find more information?

Thanks

73 de Jon - WA2YVL
NNNN

From: Dewayne Hendricks[SMTP:dewayne@warpspeed.com]
Sent: Saturday, January 11, 1997 9:06 AM
To: ss@tapr.org
Subject: [SS:811] RE: 809] Re: FreeWave

At 10:00 AM -0600 1/11/97, Phillip Wymer Via Packet wrote:
>I also Talked to Dorthy on the 10th of January and was told the same
thing.
>but am not sure of the model that will be shipped to us im hoping it is
>the 1 watt
>version. Does anyone know exactly what version they are going to ship?

Be assured. It will be the 1 watt model.

-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com  
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM  
Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>  
~~~~~

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M24=&3U)>[0D]55$%7145+25)%041'04+24Y425$14D-(259%4T%,15Q/3TM%
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M,C4U'H'#$!-L0ME;F<Q,#,0%+"+"A11")C"$ @2-QE!:<P+< "<H'$AOJ%
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M2'HAB82+0/R%A14!$ _R6B!") A(0,@'X 3T!)>@$!\)'>/$'8>PR,""/?(TG/>
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M'_S5!'B >4!/)!) CH"M1,'"('IQ\I'-10U@B" (@'CT7<>'60-A)F"X A
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M/O$%BVQI#$X+N ""&DM,32)- WP#-' HPM9,38'H/H#8!/0+/@'\$/\#$
M=PMP(T)&),"#&I#SD$)&('(@D0 T&XY-J<0'+0-)&1'/&!,4TU44H-H-L&S'
MHMT!'H')P+=)$@) '[Y!:'M74-01'T&8 (P1:]K1KL&$'0<(&'L'#02DT'<'4*
MP'8@,3$Q4#&(.3DW+L Z,#84L.9-2E]$?$5103)]&NP00UD !D!-0+@GP9U'?
M2VYX=&J)+?20T:[2]3U#HX3Y!!="!%5!]','HY6@E5[ QDATL/Z85[C9'
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M2U_JEL0' BA8>0!&P.$P$0T.-@-2*3>2:RBPI!&E-/T'T'0F$D3%;%MU2' B
M96%'Y(j%G;RCR-V%J8CL]15/'0B(!!!H@4GP+Y-IYFRX?VDD9S8'A4+ 1W9V
M#M@J@?J]X_WH/Q]+WR#'"H5'C0B03X@:$1.4%" A%+ $3QT7L%A%3D12\5E'
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M+HC@^Y54XDPB,!0=R3!;& /C Q4(C@+L T-3,YU'TS'= TAI17C !7C 0\
M_Y )<H$Q+W<EC- N27LO/HG687@95[ H-1K -& W-S#P+3DX-8N3H)]XCY$0
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""'70H'
end
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47. Re: [SS:812] RE: 811] RE: 809] Re: FreeWave

From: Tony McConnell <n3jly@erols.com>
Date: Sun, 12 Jan 1997 00:18:51 -0500
To: ss@tapr.org
Message-ID: <199701120518.AAA10373@mx03.erols.com>
Rendered body type: text/plain

I read back in the archives
>and looked for more info on the FreeWave.
Could someone steer me to a web site or sometime
>where I could find more information?

you could try the freewave web site www.freewave.com

48. Read: 813] SS digest 210

From: David Wang MD <WANG@rad.hfh.edu>
Date: Sun, 12 Jan 97 15:05:00 PST

To: "'ss'" <ss@tapr.org>
Message-ID: <32D96D45@hfh.rad.hfh.edu>
Rendered body type: text/plain
[Empty message body]

49. Re: [SS:807] FreeWave

From: Phil Karn <karn@laptop.ka9q.ampr.org>
Date: Sun, 12 Jan 1997 15:49:30 -0800 (PST)
To: ss@tapr.org
Message-ID: <m0vjZec-000MDxC@laptop.ka9q.ampr.org>
Rendered body type: text/plain

> I was visiting the freewave site and saw something I hadn't
> noticed before, that the units are 115Kb FULL duplex. Not a minor

I seriously doubt the radios themselves are full duplex, though the user interfaces to them may well be. With fast TR switching, a half duplex radio can look like a full duplex radio of roughly half the speed.

Phil

50. Unlicensed National Information Infrastructure

From: "Lee W. Fry" <lfry@wdl.lmco.com>
Date: Mon, 13 Jan 1997 08:50:57 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970113135057.006a3d84@wdl1.wdl.lmco.com>
Rendered body type: text/plain

By Report and Order FCC 97-005 January 9, 1997 the FCC has created a home for the NII. See <http://www.fcc.gov/oet/headline/et96-102/> for details.

Quoting some selected paragraphs from 97-005:

"By this action, we amend Part 15 of our rules to make available 300 megahertz of spectrum at 5.15-5.35 GHz and 5.725-5.825 GHz for use by a new category of unlicensed equipment, called Unlicensed National Information Infrastructure ("U-NII") devices."

"The Commission has determined that the public interest is best serviced by increasing the maximum peak power limit as follows: 50 mW peak transmitter output power with up to 6 dBi antenna gain (equates to 200 mW EIRP) permitted in the 5.15-5.25 GHz band; 250 mW peak transmitter output power with up to 6 dBi antenna gain (equates to 1 W EIRP) permitted in the 5.25-5.35 GHz band; and 1 W peak transmitter output power with up to 6 dBi antenna gain (equates to 4 W EIRP) permitted in the 5.725-5.825 GHz band. In addition, to permit manufacturers flexibility in designing U-NII equipment, the Commission will permit the use of higher directional antenna gain provided there is a corresponding reduction in transmitter output power of one dB for every dB that the directional antenna gain exceeds 6 dBi. Also, U-NII use of the 5.15-5.25 GHz band is restricted to indoor operations only. Further, this action adopts a power spectral density ("PSD") requirement for U-NII devices that would require that the maximum power be spread across of bandwidth of at least 20 megahertz. This PSD requirement will ensure that U-NII devices spread its signal energy evenly across the band and encourages the use of this spectrum by wideband high data rate applications, but permits non-wideband operations at reduced powers. These increased power limits will permit U-NII equipment manufacturers, many of which may be small businesses, more flexibility to develop products to meet market demands."

"The Commission has now concluded that the proposed LBT spectrum etiquette could delay deployment of U-NII devices and hinder innovation in the development of these devices. Rather, the Commission has concluded that simple technical rules, such as PSD limits and out-of-band emission requirements, should be sufficient to ensure spectrum sharing between incumbent operations and new U-NII devices. The Commission declined to adopt a spectrum etiquette, any channelization plan, or a minimum modulation efficiency requirement because such requirements may preclude certain technologies or some of the many different concepts envisioned by U-NII proponents. We believe this action will benefit small entities by permitting these entities to develop innovative equipment to meet market demands without having to follow protocols governing use of the spectrum. "

Lee W. Fry
lfry@wdl.lmco.com

51. Read: [SS:812] RE: 811] RE: 809] Re: FreeWave

From: "Rochford, Richard E." <rero@cbmsmail.cb.lucent.com>
Date: 13 Jan 97 08:50:00 -0500
To: "ss" <ss@tapr.org>
Message-ID: <32DA3E63@cbmsmail.cb.lucent.com>
Rendered body type: text/plain
[Empty message body]

52. Re: [SS:815] Re: FreeWave

From: Tony McConnell <n3jly@erols.com>
Date: Mon, 13 Jan 1997 10:24:57 -0500
To: ss@tapr.org
Message-ID: <199701131524.KAA11806@mx02.erols.com>
Rendered body type: text/plain

At 07:27 AM 1/13/97 -0600, you wrote:
>> I was visiting the freewave site and saw something I hadn't
>>noticed before, that the units are 115Kb FULL duplex. Not a minor
>
>I seriously doubt the radios themselves are full duplex, though the
>user interfaces to them may well be. With fast TR switching, a half
>duplex radio can look like a full duplex radio of roughly half the
>speed.
>
>Phil
>
>
>

I do understand your reservations about that. They could
make the spec sheet clearer if not.

53. Re: [SS:815] Re: FreeWave

From: Jack Taylor <n7oo@goodnet.com>
Date: Mon, 13 Jan 1997 11:12:30 -0700 (MST)
To: ss@tapr.org
Message-ID: <Pine.GS0.3.95.970113110301.10592C-100000@goodguy>
Rendered body type: text/plain

In looking at the FreeWave web site, it appears the RS-232 OEM module
coupled with the bipolar 5 watt amplifier would have equal application for
amateur use as well. This combination would have the advantage of
providing a remote site configuration. The specs on the bipolar amp
include receiver front-end filtering against out-of-band cellular and
paging services as well as yielding a 1.5 dB noise figure.

The bipolar amp can be tower mounted at the antenna, thus reducing the
need for low loss transmission line. Their RS-232 OEM module has nearly
the same specs as does the transciever, with the exception of 400 Mw
output power, which considering transmission line losses, should be
capable of driving the remote bipolar amp.

73 de Jack

54. Re: [SS:818] Re: FreeWave

From: mciminer@jazz.jpl.nasa.gov (Michael Ciminera)
Date: Mon, 13 Jan 97 10:21:57 PST
To: ss@tapr.org
Cc: mciminer@jazz.jpl.nasa.gov
Message-ID: <9701131821.AA01182@jazz.Jpl.Nasa.Gov>
Rendered body type: text/plain
Hi there,

What is the cost to buy ONE
of the 115kbps freewave RF modems
purchased by TAPR?

What is the cost to buy TEN?

What is the deadline for purchase?

Who do I send the money to?

Who do i email or talk to?

help!
mike ciminera wc6a

55. Re: [SS:819] Re: FreeWave

From: "L. J. Shepherd" <ljs@west.net>
Date: Mon, 13 Jan 1997 20:33:47 -0800 (PST)
To: ss@tapr.org
Message-ID: <199701140433.UAA16154@acme.sb.west.net>
Rendered body type: text/plain

Jack: I concur with your comments.....I had noticed the same two additional products which could be of great practical interest, most especially for those of us who live in city areas with substantial 900 MHz rf densities. With longer link distances unless some type of very low loss transmission line is selected, the losses will be significant, and the application of the bipolar amplifier product seems like a worthwhile addition. I don't recall the drive characteristics of the transmit amplifier.....it may be that the 1w units will be needed in installations with long transmission line requirements. In any event, thanks for your posting.
73, L. J. Shepherd K6OYY TAPR 502

At 12:16 PM 1/13/97 -0600, you wrote:

>In looking at the FreeWave web site, it appears the RS-232 OEM module
>coupled with the bipolar 5 watt amplifier would have equal application for
>amateur use as well. This combination would have the advantage of
>providing a remote site configuration. The specs on the bipolar amp
>include receiver front-end filtering against out-of-band cellular and
>paging services as well as yielding a 1.5 dB noise figure.
>

>The bipolar amp can be tower mounted at the antenna, thus reducing the
>need for low loss transmission line. Their RS-232 OEM module has nearly
>the same specs as does the transceiver, with the exception of 400 Mw
>output power, which considering transmission line losses, should be
>capable of driving the remote bipolar amp.
>

>73 de Jack
>
>
>
>

56. Re: [SS:821] Re: FreeWave

From: George Cserenyi <zsoltdirect.ca>
Date: Mon, 13 Jan 1997 22:33:59 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970113222309.6988B-100000@boxer.direct.ca>
Rendered body type: text/plain

Hi,
While reading this thread for a while with interest
I was wondering, what would be the best way to extend
the range, beyond the limitations of the point to point
method of communication. A repeater of some sort perhaps?
73 de George

On Mon, 13 Jan 1997, L. J. Shepherd wrote:

> Jack: I concur with your comments.....I had noticed the same two
> additional products which could be of great practical interest, most
> especially for those of us who live in city areas with substantial 900 MHz
> rf densities. With longer link distances unless some type of very low loss
> transmission line is selected, the losses will be significant, and the
> application of the bipolar amplifier product seems like a worthwhile
> addition. I don't recall the drive characteristics of the transmit
> amplifier.....it may be that the 1w units will be needed in installations
> with long transmission line requirements. In any event, thanks for your
> posting.
73, L. J. Shepherd K6OYY TAPR 502
>
>
>

> At 12:16 PM 1/13/97 -0600, you wrote:

> >In looking at the FreeWave web site, it appears the RS-232 OEM module
> >coupled with the bipolar 5 watt amplifier would have equal application for
> >amateur use as well. This combination would have the advantage of
> >providing a remote site configuration. The specs on the bipolar amp
> >include receiver front-end filtering against out-of-band cellular and
> >paging services as well as yielding a 1.5 dB noise figure.
> >
> >

> >The bipolar amp can be tower mounted at the antenna, thus reducing the
> >need for low loss transmission line. Their RS-232 OEM module has nearly

best regards/bob K6KGS

Hello George: According to the spec sheets, three functional modes are available: point to point, point to multipoint, and store and forward. Seems like the store and forward mode would have direct application in a range extension (repeater) scenario. It would be interesting to know if the Freewave units operating in store and forward mode can handle a multipoint system configuration, such that multiple (different) point to point relays could pass via a common store and forward repeater in a compatible manner. This is really not my area of expertise, but I suspect that the frequency hopping codes would be of principal concern in such a system. Interesting new things to consider with SS !

73, L. J. Shepherd K6OYY

From: Lawrence Stoskopf <stoskopf@tri.net>
Date: Wed, 15 Jan 1997 16:54:47 -0600

To: ss@tapr.org
Message-ID: <32DD6037.7338@tri.net>
Rendered body type: text/plain

While visiting with my Internet provider about the poor telephone connections here..four miles from town..and my difficulty in getting the 33.6 modem to even act at half that when the weather is wet(the line is buried!), I happened to mention the FreeWave TAPR project and the fact that it seems to work at 115K. He is not a ham, but commented that he would give me a port on his server and rooftop (or 2nd story window) access for an antenna as an alternative to my phone access.

We are not quite line of sight, but the path should work. Guess I need to know if the FreeWave will work serial port to serial port without too much grief? Any idea how far we can run the data line as I think his server is on the back of the building on the first floor and I would need to get to the front of the second and loss in the data line should be less than at 900 MHz?

Thanks,

N0UU

62. [RE: 827] FreeWave for Internet access

From: David Dennis <ddennis@metronet.com>
Date: Wed, 15 Jan 1997 21:59:05 -0600
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BC032F.C13BCFC0@dal61.metronet.com>
Rendered body type: text/plain

You might want to use one of those cool fiber optic RS232 extenders. Honeywell makes some and so do some other people.

From: Lawrence Stoskopf[SMTP:stoskopf@tri.net]
Sent: Wed, January 15, 1997 2:29 PM
To: ss@tapr.org
Subject: [SS:827] FreeWave for Internet access

While visiting with my Internet provider about the poor telephone connections here..four miles from town..and my difficulty in getting the 33.6 modem to even act at half that when the weather is wet(the line is buried!), I happened to mention the FreeWave TAPR project and the fact that it seems to work at 115K. He is not a ham, but commented that he would give me a port on his server and rooftop (or 2nd story window) access for an antenna as an alternative to my phone access.

We are not quite line of sight, but the path should work. Guess I need to know if the FreeWave will work serial port to serial port without too much grief? Any idea how far we can run the data line as I think his server is on the back of the building on the first floor and I would need to get to the front of the second and loss in the data line should be less than at 900 MHz?

Thanks,

N0UU

63. Re: [SS:827] FreeWave for Internet access

From: Jeff King <jeff@mich.com>
Date: Wed, 15 Jan 1997 23:16:15 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970116041615.0070b8d0@mich.com>
Rendered body type: text/plain

At 08:29 PM 1/15/97 -0600, Lawrence Stoskopf wrote:
>While visiting with my Internet provider about the poor telephone
>connections here..four miles from town..and my difficulty in getting the
>33.6 modem to even act at half that when the weather is wet(the line is
>buried!), I happened to mention the FreeWave TAPR project and the fact
>that it seems to work at 115K. He is not a ham, but commented that he
>would give me a port on his server and rooftop (or 2nd story window)
>access for an antenna as an alternative to my phone access.
>
>We are not quite line of sight, but the path should work. Guess I need
>to know if the FreeWave will work serial port to serial port without too
>much grief? Any idea how far we can run the data line as I think his
>server is on the back of the building on the first floor and I would

>need to get to the front of the second and loss in the data line should
>be less than at 900 MHz?
>
>Thanks,
>
>N0UU
>
>

Thats how I do it Lawrence. I have a FreeWave at my ISP. Been there over a year and only outages have been when the PPP daemon on the linux box died.

I did have some problems with the data line. Make sure to use low capacitence runs.... my first run was with shielded cable and the PC's serial port couldn't drive it. My Data run at the ISP is 20 feet, with 50 feet of 9913. At the home office, I have 30 feet of RS-232 with a 50 foot 9913 run. Data line is also much cheaper then 9913. Worst case, you could get some RS-422 converters if the data run was very long. My rs-232 rate at both sites is 115kbaud. BTW, the FreeWave also supports 230Kbaud on the serial line.

Good luck.

Regards,

```
-----  
| Jeff King      Aero Data Systems |  
| jeff@mich.com  P.O. Box 9325     |  
| (810)471-1787  Livonia, MI 48151 |  
|F(810)471-0279  United States     |  
-----
```

64. R: [SS:827] FreeWave for Internet access

From: "S.Coccon" <coccpce@mailbox.nauta.it>
Date: Thu, 16 Jan 1997 08:48:55 +0100
To: <ss@tapr.org>
Message-ID: <199701160752.IAA01477@mail.nauta.it>
Rendered body type: text/plain

Dear Lawrence, I have personal experience of cheap fiber optic asynchronous, ful-duplex interfaces.

These devices use 50/125 or 62,5/125 um multimode twin optical fibre and are able to connect sites at 2 or 3 kilometers.

Their electrical interface is RS232 or RS422.

Ciao - Stefano

```
-----  
> Da: Lawrence Stoskopf <stoskopf@tri.net>  
> A: ss@tapr.org  
> Oggetto: [SS:827] FreeWave for Internet access  
> Data: giovedì 16 gennaio 1997 3.29  
>  
> While visiting with my Internet provider about the poor telephone  
> connections here..four miles from town..and my difficulty in getting the  
> 33.6 modem to even act at half that when the weather is wet(the line is  
> buried!), I happened to mention the FreeWave TAPR project and the fact  
> that it seems to work at 115K. He is not a ham, but commented that he  
> would give me a port on his server and rooftop (or 2nd story window)  
> access for an antenna as an alternative to my phone access.  
>  
> We are not quite line of sight, but the path should work. Guess I need  
> to know if the FreeWave will work serial port to serial port without too  
> much grief? Any idea how far we can run the data line as I think his  
> server is on the back of the building on the first floor and I would  
> need to get to the front of the second and loss in the data line should  
> be less than at 900 MHz?  
>  
> Thanks,  
>  
> N0UU
```

65. Re: [SS:827] FreeWave for Internet access

From: Ron Cole <rdcole@mindspring.com>
Date: Thu, 16 Jan 1997 18:00:42 -0600

To: ss@tapr.org
Message-ID: <32DEC12A.3A5D@mindspring.com>
Rendered body type: text/plain

Lawrence Stoskopf wrote:

>
> While visiting with my Internet provider about the poor telephone
> connections here..four miles from town..and my difficulty in getting the
> 33.6 modem to even act at half that when the weather is wet(the line is
> buried!), I happened to mention the FreeWave TAPR project and the fact
> that it seems to work at 115K. He is not a ham, but commented that he
> would give me a port on his server and rooftop (or 2nd story window)
> access for an antenna as an alternative to my phone access.
>
> We are not quite line of sight, but the path should work. Guess I need
> to know if the FreeWave will work serial port to serial port without too
> much grief? Any idea how far we can run the data line as I think his
> server is on the back of the building on the first floor and I would
> need to get to the front of the second and loss in the data line should
> be less than at 900 MHz?
>
> Thanks,
>
> N0UU

The Radios are a Serial port radio and will pass the internet connection from his server to you computer niceley. For the data wiring I would pick up a couple of RS-485 converters. This should allow serial data to be extended to about 1000' without too much problem. Telebyte and Black Box both make RS-232 extenders that should make this project work.

Ron Cole
N5HYH

66. Re: [SS:831] Re: FreeWave for Internet access

From: Tim Pozar <pozar@kumr.lns.com>
Date: Thu, 16 Jan 1997 17:15:00 -0800 (PST)
To: ss@tapr.org
Message-ID: <199701170115.RAA02615@kumr.lns.com>
Rendered body type: text/plain

Lawrence Stoskopf wrote:

> While visiting with my Internet provider about the poor telephone
> connections here..four miles from town..and my difficulty in getting the
> 33.6 modem to even act at half that when the weather is wet(the line is
> buried!), I happened to mention the FreeWave TAPR project and the fact
> that it seems to work at 115K. He is not a ham, but commented that he
> would give me a port on his server and rooftop (or 2nd story window)
> access for an antenna as an alternative to my phone access.

Gads! Sounds like just what I have been looking for! I check out the tapr web page and all I can find on this project is a page that sez:

<http://www.tapr.org/ss/radio900.html>

This page will be back on-line Tuesday (1/7/97).
Please check back then for full details on the purchase.

And a picture.

Can anyone point to specs on this thing and if any are available and at what cost?

Thanks...
Tim
--

Internet: pozar @ kumr.lns.com
Snail: Tim Pozar / LNS / 1978 45th Ave / San Francisco CA 94116 / USA
POTS: +1 415 665 3790 Radio: KC6GNJ / KAE6247

67. Re: [SS:829] Re: FreeWave for Internet access

From: Lawrence Stoskopf <stoskopf@tri.net>
Date: Thu, 16 Jan 1997 21:15:37 -0600
To: ss@tapr.org
Message-ID: <32DEEED9.120@tri.net>
Rendered body type: text/plain

Thanks,

Got to see if the budget will handle it.

N0UU

68. Re: [SS:830] R: FreeWave for Internet access

From: Lawrence Stoskopf <stoskopf@tri.net>
Date: Thu, 16 Jan 1997 21:22:26 -0600
To: ss@tapr.org
Message-ID: <32DEF072.7D55@tri.net>
Rendered body type: text/plain

S.Coccon wrote:

>
> Dear Lawrence, I have personal experience of cheap fiber optic
> asynchronous, full-duplex interfaces.
>
> These devices use 50/125 or 62,5/125 um multimode twin optical fibre and
> are able to connect sites at 2 or 3 kilometers.
>
> Their electrical interface is RS232 or RS422.
>
> Ciao - Stefano

Thanks for the answer. I'm going to do something like that to run a sig
to a remote TX/RX in a shed about 600 meters from the shack.

Leave for Rome tomorrow night. Will be on the Via Veneto Sunday PM for
5 days. Hoping for better weather than the 0 degrees C here.

73

N0UU

69. Re: [SS:831] Re: FreeWave for Internet access

From: Lawrence Stoskopf <stoskopf@tri.net>
Date: Thu, 16 Jan 1997 21:43:32 -0600
To: ss@tapr.org
Message-ID: <32DEF564.7D41@tri.net>
Rendered body type: text/plain

Thanks, will try if budget will allow!

N0UU

> The Radios are a Serial port radio and will pass the internet connection
> from his server to you computer niceley. For the data wiring I would
> pick up a couple of RS-485 converters. This should allow serial data to
> be extended to about 1000' without too much problem. Telebyte and Black
> Box both make RS-232 extenders that should make this project work.
>
> Ron Cole
> N5HYH

70. Re: [SS:832] Re: FreeWave for Internet access

From: Larry Bush <lbush@eramp.net>
Date: Thu, 16 Jan 1997 22:32:29 -0600
To: ss@tapr.org
Message-ID: <2.2.32.19970117043229.00693234@eramp.net>
Rendered body type: text/plain

At 07:19 PM 1/16/97 -0600, you wrote:

>Lawrence Stoskopf wrote:
>> While visiting with my Internet provider about the poor telephone
>> connections here..four miles from town..and my difficulty in getting the
>> 33.6 modem to even act at half that when the weather is wet(the line is
>> buried!), I happened to mention the FreeWave TAPR project and the fact
>> that it seems to work at 115K. He is not a ham, but commented that he
>> would give me a port on his server and rooftop (or 2nd story window)
>> access for an antenna as an alternative to my phone access.
>
>Gads! Sounds like just what I have been looking for! I check out the tapr
>web page and all I can find on this project is a page that sez:
>
><http://www.tapr.org/ss/radio900.html>
>
>This page will be back on-line Tuesday (1/7/97).
>Please check back then for full details on the purchase.
>
>And a picture.

>
>Can anyone point to specs on this thing and if any are available and at
>what cost?
>
>Thanks...
>Tim
>--
> Internet: pozar @ kumr.lns.com
> Snail: Tim Pozar / LNS / 1978 45th Ave / San Francisco CA 94116 / USA
> POTS: +1 415 665 3790 Radio: KC6GNJ / KAE6247
>
>

Check out web site <http://www.teleport.com/~nts/freewave/fw1.html>

73
Larry Bush, W5NCD
359 Arrowhead Point
Waco, Texas 76712
phone 817-848-5155
Fax # 817-299-1040

71. Re: [SS:832] Re: FreeWave for Internet access

From: Larry Bush <lbush@eramp.net>
Date: Thu, 16 Jan 1997 22:38:04 -0600
To: ss@tapr.org
Message-ID: <2.2.32.19970117043804.00691d14@eramp.net>
Rendered body type: text/plain
>Can anyone point to specs on this thing and if any are available and at
>what cost?
>
>Thanks...
>Tim
>--
> Internet: pozar @ kumr.lns.com
> Snail: Tim Pozar / LNS / 1978 45th Ave / San Francisco CA 94116 / USA
> POTS: +1 415 665 3790 Radio: KC6GNJ / KAE6247
>
>

Also check site <http://www.freewave.com/dgr115.html>

73
Larry Bush, W5NCD
359 Arrowhead Point
Waco, Texas 76712
phone 817-848-5155
Fax # 817-299-1040

72. Re: [SS:836] Re: FreeWave for Internet access

From: Tim Pozar <pozar@kumr.lns.com>
Date: Fri, 17 Jan 1997 08:09:45 -0800 (PST)
To: ss@tapr.org
Message-ID: <199701171609.IAA15018@kumr.lns.com>
Rendered body type: text/plain
Larry Bush wrote:
> At 07:19 PM 1/16/97 -0600, you wrote:
> >Gads! Sounds like just what I have been looking for! I check out the tapr
> >web page and all I can find on this project is a page that sez:
> >
> ><http://www.tapr.org/ss/radio900.html>
> >
> >This page will be back on-line Tuesday (1/7/97).
> >Please check back then for full details on the purchase.
> >
> >And a picture.
> >
> >Can anyone point to specs on this thing and if any are available and at
> >what cost?
> >
> Check out web site <http://www.teleport.com/~nts/freewave/fw1.html>

Thanks folks for all the pointers. I think I am clued in now. :-)

Tim

--

73. WEB Page Problems...

From: Dino Darling <dinod@deltanet.com>
Date: Fri, 17 Jan 1997 11:14:20 -0800
To: ss@tapr.org
Message-ID: <1.5.4.32.19970117191420.006976a0@mail.deltanet.com>
Rendered body type: text/plain

Hello My friend Steve Ruiz (KN6XQ) is using LYNX 2-4-2 to view the following page...

<http://www.tapr.org/ss/radio900.html>

He is receiving ALL the data on the radio. I'm using Netscape (the BEST) version 3.01.
I am NOT receiving all the data on the page (ie specs). I cleared my MEMORY CASHE and my DISK CASHE.
Still nothing when reloading the page. I can do VIEW/DOCUMENT SOURCE and see the data but Netscape does not view it.

HELP PLEASE!!!Dino...dinod@deltanet.com

74. Re: [SS:834] Re: R: FreeWave for Internet access

From: Stefano Coccon <coccpc@mailbox.nauta.it>
Date: Fri, 17 Jan 1997 20:50:37 -0800
To: ss@tapr.org
Message-ID: <32E0569D.E53@mailbox.nauta.it>
Rendered body type: text/plain

Lawrence Stoskopf wrote:

>
> S.Coccon wrote:
> >
> > Dear Lawrence, I have personal experience of cheap fiber optic
> > asynchronous, ful-duplex interfaces.
> >
> > These devices use 50/125 or 62,5/125 um multimode twin optical fibre and
> > are able to connect sites at 2 or 3 kilometers.
> >
> > Their electrical interface is RS232 or RS422.
> >
> > Ciao - Stefano
>
> Thanks for the answer. I'm going to do something like that to run a sig
> to a remote TX/RX in a shed about 600 meters from the shack.
>
> Leave for Rome tomorrow night. Will be on the Via Veneto Sunday PM for
> 5 days. Hoping for better weather than the 0 degrees C here.
>
> 73
>
> NOUU
Dear Lawrence,
I hope this mail'll reach you before your trip.

Regarding the possibilities to use optical fibres I can give you direct help.

I see that you are going to Roma...I was born there but it is a lot of time that I do not go there.

If you wish to have more informations you can phone me:

(0432)-961197 or (0338)-374592

if you can use a fax I have some documentation on optical links.

Ciao - Stefano

75. Freewave

From: Tony McConnell <n3jly@erols.com>
Date: Fri, 17 Jan 1997 15:06:09 -0500
To: ss@tapr.org
Message-ID: <199701172006.PAA03519@mx03.erols.com>
Rendered body type: text/plain

I left voice mail yesterday ordering a pair of them.

With waiting till enough orders come in, and the end of the month, with my luck the UPS man will pull upto my house while i'm driving to the airport to go to Dayton.

I'm really looking forward to going this year. I missed last year with a broken foot(could've gone but no flea marketing? what's the point).

Haven't seen the schedule yet. Will there be any good SS symposiums or presentations?

Tony

76. Re: [SS:841] Freewave

From: Tim Pozar <pozar@kumr.lns.com>
Date: Fri, 17 Jan 1997 14:15:34 -0800 (PST)
To: ss@tapr.org
Message-ID: <199701172215.OAA19319@kumr.lns.com>
Rendered body type: text/plain

Tony McConnell wrote:

> I left voice mail yesterday ordering a pair of them.
>
> With waiting till enough orders come in, and the end of
> the month, with my luck the UPS man will pull upto my
> house while i'm driving to the airport to go to Dayton.

>From who, how much?

Thanks...
Tim

--

Internet: pozar @ kumr.lns.com
Snail: Tim Pozar / LNS / 1978 45th Ave / San Francisco CA 94116 / USA
POTS: +1 415 665 3790 Radio: KC6GNJ / KAE6247

77. apology

From: Lawrence Stoskopf <stoskopf@tri.net>
Date: Fri, 17 Jan 1997 16:30:57 -0600
To: ss@tapr.org
Message-ID: <32DFFDA1.1018@tri.net>
Rendered body type: text/plain

Sorry that I posted several replies to this forum instead of individually. Probably will order two of the units next week when I get back and value this forum.

N0UU

78. Re: [SS:842] Re: Freewave

From: George Cserenyi <zsolt@direct.ca>
Date: Fri, 17 Jan 1997 16:45:47 -0800 (PST)
To: Tim Pozar <pozar@kumr.lns.com>
Cc: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970117164503.4808A-100000@boxer.direct.ca>
Rendered body type: text/plain

On Fri, 17 Jan 1997, Tim Pozar wrote:

> Tony McConnell wrote:
> > I left voice mail yesterday ordering a pair of them.
> >
> > With waiting till enough orders come in, and the end of
> > the month, with my luck the UPS man will pull upto my
> > house while i'm driving to the airport to go to Dayton.

>
>
> >From who, how much?

>
> Thanks...
> Tim

>

> --

>
> Internet: pozar @ kumr.lns.com
> Snail: Tim Pozar / LNS / 1978 45th Ave / San Francisco CA 94116 / USA
> POTS: +1 415 665 3790 Radio: KC6GNJ / KAE6247
>

Thanks for what?
How much?
George

79. Re: [SS:842] Re: Freewave

From: Tony McConnell <n3jly@erols.com>
Date: Fri, 17 Jan 1997 19:32:04 -0500
To: ss@tapr.org
Message-ID: <199701180032.TAA15046@mx02.erols.com>
Rendered body type: text/plain

>Tony McConnell wrote:
>> I left voice mail yesterday ordering a pair of them.

>>From who, how much?
>

>Thanks...

>Tim

TAPR has arranged a group purchase. ~\$400 each

80. Re: [SS:845] Re: Freewave

From: ka8pog@bbs.ka8pog.ampr.org
Date: Fri, 17 Jan 97 22:41:34 EST
To: ss@tapr.org
Message-ID: <6264@bbs.ka8pog.ampr.org>
Rendered body type: text/plain

I was under the impresson the radios were 275 but I could be wrong.
the non group price is 400 I hope.
ugh! anyway or either way Im really looking forward to the hi speed stuff
anyone for sure what these radios are at group price?
also anyone out there have plans for building home brew antennas for the radios?
Phil

81. Preliminary results performance tests of WaveLAN 915 MHz systems.

From: Fred Treasure <fred@astro.wnmu.edu>
Date: Sat, 18 Jan 1997 16:37:54 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199701181637.QAA00287@a202.wnmu.edu>
Rendered body type: text/plain

I've been making some performance tests using WaveLAN 915 MHz equipment and a variety of antennas. All of the tests have been conducted using point-to-point line-of-sight paths. The reference node is a 915 MHz WaveLAN card feeding a WaveAMP amplifier that boosts the signal to 1 watt. This is fed to 20 feet of 9913 into a 6db Antennex Vertical Antenna. This configuration is a maximum power part 15 setup.

I have three test sites at distances of .75, 4 and 5 miles from the reference node. The .75 mile site can run under part 15 rules with no problems. The 4 and 5 mile paths are more of a challenge. These sites are on a couple of mountain-tops. The 4 mile path is about 1300 feet higher than reference node (which is 6000 feet AMSL). I can get 100% copy at this site with the following setup: WaveLAN feeding WaveAMP to 25 feet 9913 to 13 element (advertised 12db) beam.

I've tried more antennas at the 5 mile path. This site is at 8000 feet AMSL. A part 15 configuration won't work at this distance. I can get intermittent packets with the 13 element beam but this is not really a usable configuration (the rest of the system is the WaveLAN, WaveAMP and 25 feet of 9913.) I tried using 60 feet of half-inch hardline to a higher location on the tower to the same 13 element beam. This didn't work at all. I next built a 25 element beam (probably about 15 db gain) and at times this would give 100% copy. The problem was with propagation effects. I suspect that the antenna was seeing some boundary-layer effects from looking down from the mountain into a warm bubble of air surrounding the town where the reference node is located. The propagation varied from no packets to 100% copy depending on time-of-day, weather, etc. I talked to the local microwave telephone company guys and they confirmed that they have seen this type of problem with some of their sites. They said the the location of the antenna was often critical, i.e. a few feet can make the difference between no path and a good one. While I was visiting the phone guys I borrowed a 6 foot parabolic dish. I built an appropriate feed assembly and found that while the dish has superior gain it is affected even more by propagation effects.

Now a question for the TAPR FreeWave group: What kind of connectors will be installed on the units? I'd like to have all of the adapters built to

start testing the units as soon as they arrive.

Fred Treasure, KE5CI
sysop@astro.wnmu.edu

82. Re: [SS:847] Preliminary results performance tests of WaveLAN 915 MHz systems.

From: Tony McConnell <n3jly@erols.com>
Date: Sat, 18 Jan 1997 13:54:12 -0500
To: ss@tapr.org
Message-ID: <199701181854.NAA23770@mx03.erols.com>
Rendered body type: text/plain

> While I was visiting the phone guys I borrowed a 6
>foot parabolic dish. I built an appropriate feed assembly and found that
>while the dish has superior gain it is affected even more by propagation
>effects.

I've seen this effect on some 900MHz links that i've installed. sometimes
it seems that a pit of multipath may be providing some 'path diversity'.
I've also seen examples of moving an antenna a few feet, in a direction
that you wouldn't necessarily think would help, help. makes me think of
'rawleigh'(sp?) fading, small pockets of null signal, it's been so long
since i've looked into this that i don't remember what causes them. But
recombant multipath could.

>Now a question for the TAPR FreeWave group: What kind of connectors will
>be installed on the units? I'd like to have all of the adapters built to
>start testing the units as soon as they arrive.

according to TAPR and Freewave Web sites, the connector is a 'left threaded
SMA'. i've been doing radio and microwave work for nearly 20 years, and i've
been fortunate enough to never see a reverse threaded SMA, and would like to
keep it that way. but i guess noone asked me.

Tony - N3JLI

83. Re: [SS:848] Re: Preliminary results performance tests of WaveLAN

From: Lyle Johnson <lylej@azstarnet.com>
Date: Sat, 18 Jan 1997 12:50:31 -0700 (MST)
To: ss@tapr.org
Message-ID: <3.0.32.19970118125348.005e0410@pop.azstarnet.com>
Rendered body type: text/plain

Tony,

Part15 requires that units with separable antennas use conenctors that
mortal humans cannot obtain. This is to prevent people from using
antennas, feedlines, etc., that weren't part of the package that received
the Part 15 blessing. It is annoying, but then it was intended to be... :-)

Cheers,

Lyle

At 12:58 PM 1/18/97 -0600, Tony McConnell wrote:

>according to TAPR and Freewave Web sites, the connector is a 'left threaded
>SMA'. i've been doing radio and microwave work for nearly 20 years, and i've
>been fortunate enough to never see a reverse threaded SMA, and would like to
>keep it that way. but i guess noone asked me.

84. Re: [SS:849] Re: Preliminary results performance tests of

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Sat, 18 Jan 1997 12:52:31 -0800
To: ss@tapr.org
Message-ID: <v03010d12af06e7506698@[204.118.182.22]>
Rendered body type: text/plain

At 1:58 PM -0600 1/18/97, Lyle Johnson wrote:

>Part15 requires that units with separable antennas use conenctors that
>mortal humans cannot obtain. This is to prevent people from using
>antennas, feedlines, etc., that weren't part of the package that received
>the Part 15 blessing. It is annoying, but then it was intended to be... :-)

This rule didn't come into effect until June, 1994. Any Part 15
device manufactured before that date did not have that restriction. Some
companies have been able to obtain a waiver from the FCC that allows them
to sell their equipment without a special connector. The catch is that the
equipment has to be 'professionally installed' and the manufacteur has to

take care to certify that this is the case. Cylink, BreezeCom and Western Multiplex are examples of companies who have such a waiver.

-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com  
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM  
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>  
Fax: (510) 770-9854 !  
~~~~~

85. Re: [SS:849] Re: Preliminary results performance tests of

From: Tony McConnell <n3jly@erols.com>
Date: Sat, 18 Jan 1997 16:26:20 -0500
To: ss@tapr.org
Message-ID: <199701182126.QAA26923@mx04.erols.com>
Rendered body type: text/plain

>Tony,
>
>Part15 requires that units with separable antennas use conenctors that
>mortal humans cannot obtain.
>
>Lyle
>
>At 12:58 PM 1/18/97 -0600, Tony McConnell wrote:
>>according to TAPR and Freewave Web sites, the connector is a 'left threaded
>>SMA'.

I just spent sevral minutes looking through the Pasternack catalog and saw no sign of such things

ARe you using freewave cables and antennae(yeah right!) or did you find a source for the fittings? I guess that worst case i can order one short jumper and make two adapter cables from it.

i've already put up a DB586 to start testing, maybe
i should put up a 900 beacon and see how far it goes. unfortunately the only options
i've got for a transmitter would be +20dBm from some test equipment or 150 to 300 watts
from a Motorola PURC(well i guess i could use exciter out instead 7 to 10 or something
like that). hmm maybe i will get that warmed up and see how it goes.

Tony N3JLI

86. RE: 849] Re: Preliminary results performance tests of

From: "Guy Mallery" <wa2msu@msn.com>
Date: Sat, 18 Jan 97 21:37:22 UT
To: ss@tapr.org
Message-ID: <UPMAIL09.199701182136560875@msn.com>
Rendered body type: text/plain

*>Part15 requires that units with separable antennas use conenctors that
*>mortal humans cannot obtain. This is to prevent people from using
*>antennas, feedlines, etc., that weren't part of the package that received
*>the Part 15 blessing. It is annoying, but then it was intended to be... :-)

Hey there...

Try the customer service page at:

<http://www.johnsoncomp.com>

73,
Guy, wa2msu/6
wa2msu@msn.com
Stockton, CA

>according to TAPR and Freewave Web sites, the connector is a 'left threaded
>SMA'. i've been doing radio and microwave work for nearly 20 years, and i've
>been fortunate enough to never see a reverse threaded SMA, and would like to
>keep it that way. but i guess noone asked me.

87. Re: [SS:849] Re: Preliminary results performance tests of

From: Glenn Little <glittle@awod.com>
Date: Sat, 18 Jan 1997 16:59:29 -0500
To: ss@tapr.org
Message-ID: <199701182154.QAA09283@sumter.awod.com>
Rendered body type: text/plain

At 01:58 PM 1/18/97 -0600, you wrote:
>Tony,
>
>Part15 requires that units with separable antennas use conenctors that
>mortal humans cannot obtain. This is to prevent people from using
>antennas, feedlines, etc., that weren't part of the package that received
>the Part 15 blessing. It is annoying, but then it was intended to be... :-)
>
>Cheers,
>
>Lyle
>
>At 12:58 PM 1/18/97 -0600, Tony McConnell wrote:
>>according to TAPR and Freewave Web sites, the connector is a 'left threaded
>>SMA'. i've been doing radio and microwave work for nearly 20 years, and i've
>>been fortunate enough to never see a reverse threaded SMA, and would like to
>>keep it that way. but i guess noone asked me.
>
>
>
I ran into a Wang Network card that used RF. It had a reverse threaded F
fitting. I thought that this was to keep the zero IQ installers from
reversing the TX and RX lines. I guess I was wrong. There may be other
reverse threaded connectors out there.
73

Glenn Little
WB4UIV

WB4UIV@amsat.org
glittle@awod.com

88. Re: [SS:845] Re: Freewave

From: George Cserenyi <zsolt@direct.ca>
Date: Sat, 18 Jan 1997 19:58:30 -0800 (PST)
To: Tony McConnell <n3jly@erols.com>
Cc: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970117200857.5297A-100000@boxer.direct.ca>
Rendered body type: text/plain

Hi,

On Fri, 17 Jan 1997, Tony McConnell wrote:

> >Tony McConnell wrote:
> >> I left voice mail yesterday ordering a pair of them.
>
> >>From who, how much?
> >
> >Thanks...
> >Tim
> TAPR has arranged a group purchase. ~\$400 each
>
Isn't that the regular price?
Many thanks.
George

89. Re: [SS:854] Re: Freewave

From: Wade Cotton <n5ist@ix.netcom.com>
Date: Sun, 19 Jan 1997 00:42:20 -0600
To: ss@tapr.org
Message-ID: <32E1C24C.236A@ix.netcom.com>
Rendered body type: text/plain

The regular price is about \$1250.00. The price for TAPR members
participating
in the STA is \$400.00.

George Cserenyi wrote:
>

> Hi,
>
> On Fri, 17 Jan 1997, Tony McConnell wrote:
>
> > >Tony McConnell wrote:
> > >> I left voice mail yesterday ordering a pair of them.
> >
> > >>From who, how much?
> > >
> > >Thanks...
> > >Tim
> > TAPR has arranged a group purchase. ~\$400 each
> >
> Isn't that the regular price?
> Many thanks.
> George

--
Wade Cotton
mailto:n5ist@ix.netcom.com
7117 Wood Hollow Dr. #417
Austin, Texas 78731-2549
Lat/Long: N 30 21.30' W 97 45.06'
1(512)418-9233

90. Re: [SS:847] Preliminary results performance tests of WaveLAN 915 MHz systems.

From: jrc@brainiac.mn.org (Jeffrey Comstock)
Date: Sun, 19 Jan 1997 05:13:29 -0600 (CST)
To: ss@tapr.org
Message-ID: <9701191113.AA06496@brainiac.mn.org>
Rendered body type: text/plain

>
> I've been making some performance tests using WaveLAN 915 MHz equipment and
> a variety of antennas. All of the tests have been conducted using
> point-to-point line-of-sight paths. The reference node is a 915 MHz WaveLAN

Thanks for the info. One thing, could you please tell us the model numbers
of the equipment you are testing ? There are a few different WaveLAN
models, and I am not quite sure what TAPR is offering.

91. Update on Freewave Group Purchase

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Sun, 19 Jan 1997 12:48:38 -0600
To: " Spread Spectrum "<ss@tapr.org>,
"TAPR-BB list mailing"<tapr-bb@tapr.org>
Message-ID: <v0300780aaf08180c5d9a@[208.134.134.42]>
Rendered body type: text/plain

The purpose of this message is to report to you some bad news concerning
the special purchase deal that TAPR had arranged with FreeWave
Technologies, Inc. (FW) of Boulder, CO.

First, as most of you are aware, TAPR had negotiated a special bulk
purchase agreement with FW, which allowed us to offer the FW DGR-115 Part
15.147 spread spectrum radio to our members who are participating in the
TAPR Spread Spectrum (SS) STA project, at a price which was below the
normal retail price for the unit of \$1250. An initial 'beta' order was
placed the first of December with the purpose of getting units so that the
radio could be evaluated to determine which options we wanted to request,
documentation for common interfaces written, and we could get the purchase
process setup with FreeWave. When the order was placed, we were told that
we could expect delivery before the end of 1996. However, when we finally
received a confirmation of our order from FW, we were informed that we
would not receive delivery of the units until January 17, 1997.

The later delivery from FW caused us to revise our plans and we decided to
start taking orders for the radio from the SS STA participants. We made
this decision due to the fact that our current STA term is only six months
and although we expect that it will be renewed, we didn't feel that we
could waste any time in getting hardware into the hands of our STA
participants.

13 days ago, we were informed that FW has cancelled the special purchase
agreement with TAPR and that TAPR will receive no other units from FW other
than the initial units that we purchased in our first 'beta' order. Since
that time, we have been trying to resolve the issue with FW, but have made
no progress on the matter to this date. As many of you have noted, there
was a special web page discussing the purchase. We removed the links and

later the page when the discussions with FreeWave were not going anywhere. TAPR will be notifying everyone that had signed up for the \$399 version of the purchase that it has been cancelled and no money will be deposited or cashed, since no order can be placed with FreeWave. Any checks for radios will be mailed back.

January 17 is now past and we still have no word from FW as to when we can expect delivery of the initial units that we have on order. Messages sent over the last 7 days have not been responded back to by anyone at FW. If I do not hear back by Monday I will call them. If that does not result in a positive solution the next step will be to involve TAPR's lawyers in the situation. I believe we will get the initial DGR-115 radios without modifications as contracted by FW in December, but the lack of communications on FW part is disheartening to say the least.

I regret this turn of events and you can be assured that everyone involved is attempting to resolve the issues. We are also working on other alternatives which would allow TAPR to offer spread spectrum radios to our STA participants at an 'affordable' price. We will be posting updates on this situation as it develops on our various mailing lists and on the TAPR web site.

Greg Jones, WD5IVD
Pres. TAPR

92. Re: [SS:857] Update on Freewave Group Purchase

From: Tony McConnell <n3jly@erols.com>
Date: Sun, 19 Jan 1997 19:28:28 -0500
To: ss@tapr.org
Message-ID: <199701200028.TAA21876@mx01.erols.com>
Rendered body type: text/plain

At 12:45 PM 1/19/97 -0600, you wrote:
>The purpose of this message is to report to you some bad news concerning
>the special purchase deal that TAPR had arranged with FreeWave
>Technologies, Inc. (FW) of Boulder, CO.
Big Snip
>I regret this turn of events and you can be assured that everyone involved
>is attempting to resolve the issues. We are also working on other
>alternatives which would allow TAPR to offer spread spectrum radios to our
>STA participants at an 'affordable' price.
>Greg Jones, WD5IVD
>Pres. TAPR

Greg,
Thank you very much for keeping us informed. This is a very disappointing situation.

Tony McConnell N3JLI

93. RE: [SS:839] WEB Page Problems...

From: Bob Lorenzini <hwm@netcom.com>
Date: Sun, 19 Jan 1997 17:23:12 -0800 (PST)
To: Dino Darling <dinod@deltanet.com>
Cc: ss@tapr.org
Message-ID: <XFMail.970119172436.hwm@netcom.com>
Rendered body type: text/plain

On 17-Jan-97 Dino Darling wrote:
>Hello My friend Steve Ruiz (KN6XQ) is using LYNX 2-4-2 to view the following
page...
>
><http://www.tapr.org/ss/radio900.html>
>
>He is receiving ALL the data on the radio. I'm using Netscape (the BEST)
version 3.01.
>I am NOT receiving all the data on the page (ie specs). I cleared my MEMORY
CASHE and my DISK CASHE. Still nothing when relo
ading the page. I can do VIEW/DOCUMENT SOURCE and see the data but Netscape
does not view it.
>
>HELP PLEASE!!!Dino...dinod@deltanet.com
>
>

This one is easy Dino, reinstall windows. I have two radio/modems on order and so does Dave, kd6buy.

wd6dod

E-Mail: Bob Lorenzini <hwm@netcom.com>
Date: 19-Jan-97
Time: 17:23:15
-----XF-Mail

94. RE: [SS:859] RE: WEB Page Problems...

From: Bob Lorenzini <hwm@netcom.com>
Date: Sun, 19 Jan 1997 19:03:56 -0800 (PST)
To: ss@tapr.org
Cc: Bob Lorenzini <hwm@netcom.com>
Message-ID: <XFMail.970119191056.hwm@netcom.com>
Rendered body type: text/plain

I'am sorry for the inadvertent personal post to the SIG. I don't always use this newsreader. Sorry. Pretty embarasing to read my sarcastic reply to a ham I have not heard from in some time.

I'am also going thru heavy depression after reading the status on the freeway order. :-(

>-----
E-Mail: Bob Lorenzini <hwm@netcom.com>
Date: 19-Jan-97
Time: 19:04:00
-----XF-Mail

95. SS of course...

From: Tony McConnell <n3jly@erols.com>
Date: Tue, 21 Jan 1997 00:40:05 -0500
To: ss@tapr.org
Message-ID: <199701210540.AAA01950@mx03.erols.com>
Rendered body type: text/plain

Ok FW pulled out, I've been working on getting the name calling out of my system and am progressing well. I'm about half as annoyed as i was yesterday, so i figure I've reached the anger half-life for this incident. In about another day or two it will be bellow the agravation threshold. But to the important part. What happens now? The FW deal sounded good, but that seems irrelevant now.

I was interested in the FW because it sounded easy and useful. I like turn-key solutions when they are available.

But what about homebrewing something? I know that this is not the answer for everyone. But I was hoping that you guys could share with me the criteria for the selection of a radio/scheme like this. what were you looking for? Is the issue really spread spectrum or high speed? What kind of data bandwidths do you want to consider? Range? Resync times? Simple off the shelf appliance operability? If someone came up with a working and reproducable homebrew, would it be of use to anyone else?

96. Re: [SS:861] SS of course...

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Tue, 21 Jan 1997 08:47:01 -0500
To: ss@tapr.org
Message-ID: <199701211347.IAA24062@Paris.GASD102designcenter>
Rendered body type: text/plain

> Ok FW pulled out, I've been working on getting the name calling out
> of my system and am progressing well. I'm about half as annoyed as
> i was yesterday, so i figure I've reached the anger half-life for
> this incident. In about another day or two it will be bellow the
> agravation threshold. But to the important part. What happens now?
> The FW deal sounded good, but that seems irrelevant now.

>
> But what about homebrewing something? I know that this is not the
> answer for everyone. But I was hoping that you guys could share with
> me the criteria for the selection of a radio/scheme like this. what
> were you looking for? Is the issue really spread spectrum or high
> speed? What kind of data bandwidths do you want to consider? Range?
> Resync times? Simple off the shelf appliance operability? If someone
> came up with a working and reproducable homebrew, would it be of use
> to anyone else?
>

Maybe the FreeWave problem is a blessing in disguise. Now is a good time for the subscribers to this list to develop a low-cost SS system themselves.

We could make it programmable, use a DSP, PLDs, FPGAs, the latest RF parts, surface-mount discrete components, etc.

73s de Tony KE4ATO

97. Re: [SS:862] Re: SS of course...

From: Phil Karn <karn@laptop.ka9q.ampr.org>
Date: Tue, 21 Jan 1997 06:52:43 -0800 (PST)
To: ss@tapr.org
Message-ID: <m0vmhZ5-000MERC@laptop.ka9q.ampr.org>
Rendered body type: text/plain

>Maybe the FreeWave problem is a blessing in disguise. Now is a good time
>for the subscribers to this list to develop a low-cost SS system themselves.

I agree...

Phil

98. Re: [SS:862] Re: SS of course...

From: Dino Darling <dinod@deltanet.com>
Date: Tue, 21 Jan 1997 07:58:24 -0800
To: ss@tapr.org
Message-ID: <1.5.4.32.19970121155824.0067d914@mail.deltanet.com>
Rendered body type: text/plain

At 07:50 AM 1/21/97 -0600, you wrote:

>
>Maybe the FreeWave problem is a blessing in disguise. Now is a good time
>for the subscribers to this list to develop a low-cost SS system themselves.
>We could make it programmable, use a DSP, PLDs, FPGAs, the latest RF parts,
>surface-mount discrete components, etc.
>
>73s de Tony KE4ATO

Maybe Amateur Radio can make improvements to this medium and design tomorrow's technology instead of using it. It gets back to the argument when Amateur Radio was designing and prototyping technology for the rest of the world instead of the other way around.

While I don't have the technical knowledge, I'm willing to make a donation to a fund to buy parts and make boards...(speaking of that, I need to re-up my TAPR membership! What about you?...)

A blessing in disguise?...quite possible! Who knows, maybe FW will want OUR technology!

STA...6 months and counting....

Dino...dinod@deltanet.com

99. Re: [SS:863] Re: SS of course...

From: Gordon_Dey@Software.Mitel.COM (Gordon Dey)
Date: Tue, 21 Jan 97 11:10:26 EST
To: ss@tapr.org
Message-ID: <9701211610.AA13599@Software.Mitel.COM>
Rendered body type: text/plain

Develop our own. Neat opportunity.
I've been kicking about the idea of gluing together:

1. one of those sexy harris PRISM chipsets;
2. motorola 68en360;
3. a 16M SIMM and a 512K flash;
4. AUI or 10-base-T spiggot;
5. a maintenace/monitor/OA&M RS232 plug.

Use the bdm to debug/re-program the flash.

Estimate:

- 1: \$100?
- 2: 60?
- 3: 100
- 4: 35?
- 5: 5

\$300?

misc hw, connectors, board, case: +\$100?
That's my 2-cents (or \$400) worth...

100. Re: [SS:862] Re: SS of course...

From: darnell@binmedia.com (Darnell Gadberry)
Date: Tue, 21 Jan 97 08:17:57 -0800
To: <ss@tapr.org>
Message-ID: <19970121161153767.AAA51@[206.117.173.2]>
Rendered body type: text/plain

>
>Maybe the FreeWave problem is a blessing in disguise. Now is a good time
>for the subscribers to this list to develop a low-cost SS system themselves.
>We could make it programmable, use a DSP, PLDs, FPGAs, the latest RF parts,
>surface-mount discrete components, etc.
>
>73s de Tony KE4ATO
>

I am working on a design for a VERY simple 902-928 MHz DSSS system using the Zilog DS controller chip. Anyone interested in helping me finish the specification and or implementation.

- darnell gadberry
Phonica/binaryMedia Engineering
ke6ucl

101. Other "FreeWaves"

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Tue, 21 Jan 1997 12:15:04 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.91.970121120727.14823A-100000@tekdata.com>
Rendered body type: text/plain

I kept an old issue of "Network Computing" because it had a large list of Wireless LANs in it (Dec. 15 1996)..

It seems there are quite a few other units that are competitive with the FreeWave. Maybe TAPR shouldn't worry about obtaining ANY units from FreeWave, and try another source instead.

The list prices for some units in the 3 mbps / 7 mile path is around \$2000... (example of one picked out the article.. "BreezeNET")... this isn't much more than the \$1300 list of the FreeWave...

I also agree with the sentiment for the ham community to develop their own units, esp. if used with some of our microwave bands.

Sorry to hear about the FreeWave problem. If anyone is interested in the "Network Computing" article, I could send more info from it...

Fred M. Spinner, KA9VAW
fred@tekdata.com, KA9VAW@amsat.org

102. Re: Other "FreeWaves"

From: "Glenn S. Tenney K0TJ" <tenney@think.org>
Date: Tue, 21 Jan 1997 13:13:49 -0800
To: ss@tapr.org
Message-ID: <v03010d0eaf0ae16169cd@[206.14.123.133]>
Rendered body type: text/plain

At 11:03 AM -0800 1/21/97, Fred M. Spinner wrote:
>The list prices for some units in the 3 mbps / 7 mile path is around
>\$2000... (example of one picked out the article.. "BreezeNET")... this
>isn't much more than the \$1300 list of the FreeWave...

Last month, while in Israel on business, I spent a couple of hours with the president of BreezeCom. Most interesting technology!!! However, they can and are selling every unit they can manufacture -- at the full going rate.

Glenn Tenney K0TJ Fantasia Systems Inc.
tenney@think.org Amateur radio: AA6ER
Voice: (415) 574-3420 Fax: (415) 574-0546

103. Re: [SS:862] Re: SS of course...

From: Glenn Little <glittle@awod.com>
Date: Tue, 21 Jan 1997 20:54:11 -0500
To: ss@tapr.org

Message-ID: <199701220149.UAA25138@sumter.awod.com>
Rendered body type: text/plain

At 07:50 AM 1/21/97 -0600, you wrote:

>
> snip
>
> Maybe the FreeWave problem is a blessing in disguise. Now is a good time
> for the subscribers to this list to develop a low-cost SS system themselves.
> We could make it programmable, use a DSP, PLDs, FPGAs, the latest RF parts,
> surface-mount discrete components, etc.
>
> 73s de Tony KE4ATO
>
>
>

How about a cell phone. These appear to be available under \$10.00 at hamfests. The radio is capable of multichannel operation. Is reasonably sensitive. Provides 3W output. RX and Tx could be sent to different antennas to do away with duplexer. Radios I have seen use dielectrically tuned filters and duplexer. These move up in freq easier than down. Just a thought.

73
Glenn Little
WB4UIV

WB4UIV@amsat.org
glittle@awod.com

104. Re: [SS:867] Other "FreeWaves"

From: xbrucex <xbrucex@popmail.mcs.net>
Date: Tue, 21 Jan 1997 20:58:29 -0600
To: ss@tapr.org
Message-ID: <199701220259.UAA18297@Kitten.mcs.com>
Rendered body type: text/plain

Fred -
I don't have a copy of Network Computing, but would be really appreciative if you would E-mail me a list of RF LAN devices PLEASE. If you would rather FAX it, I'll give you my FAX number by return E-mail.

Bruce K9BC

At 13:03 1/21/97 -0600, you wrote:
> I kept an old issue of "Network Computing" because it had a large list
> of Wireless LANs in it (Dec. 15 1996)..
>
> It seems there are quite a few other units that are competitive with
> the FreeWave. Maybe TAPR shouldn't worry about obtaining ANY units from
> FreeWave, and try another source instead.
>
> The list prices for some units in the 3 mbps / 7 mile path is around
> \$2000... (example of one picked out the article.. "BreezeNET")... this
> isn't much more than the \$1300 list of the FreeWave...
>
> I also agree with the sentiment for the ham community to develop their
> own units, esp. if used with some of our microwave bands.
>
> Sorry to hear about the FreeWave problem. If anyone is interested in the
> "Network Computing" article, I could send more info from it...
>
> Fred M. Spinner, KA9VAW
> fred@tekdata.com, KA9VAW@amsat.org
>
>
>

105. Re: [SS:869] Re: SS of course...

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Wed, 22 Jan 1997 06:46:31 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970122114631.005e78e0@mindspring.com>
Rendered body type: text/plain

At 07:55 PM 1/21/97 -0600, Glenn wrote:

> How about a cell phone. These appear to be available under \$10.00 at

>hamfests. The radio is capable of multichannel operation. Is reasonably
>sensitive. Provides 3W output. RX and Tx could be sent to different
>antennas to do away with duplexer. Radios I have seen use dielectricall
>tuned filters and duplexer. These move up in freq easier than down. Just a
>thought.

Or, how about a 900MHz SS wireless phone? I recently got a catalog from Mendelson's Electronics in Dayton OH that had refurb phones for \$50. Some phones have a separate codec and feed 32 or 64kbps data to a 160kbps transceiver section.

Alfa Inc at <http://ns1.2win.com/alfa/wireless.html> is an example of a cordless phone chip set that runs 160kbps half duplex and does time division multiplex to get 64 kbps duplex.

Cylink at <http://www.cylink.com/products/wireless/sseboard.htm> has a similar 160 kbps chip set on an eval board with CODEC chip, a single-chip microcontroller, a 900 Mhz RF module, a telephone line interface, speaker phone and microphone, an RS232 port and a keypad / LCD display for user interface.

So has anybody dissected a SS cordless phone to see what's in it?

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
<http://www.mindspring.com/~lfry/part15.htm>

106. Re: [SS:870] Re: Other "FreeWaves"

From: arutz@shfmicro.com (alan rutz)
Date: Wed, 22 Jan 1997 08:33:15 -0600
To: ss@tapr.org
Message-ID: <199701221433.IAA11993@alice.adsnet.com>
Rendered body type: text/plain

Another excellent source of information about what is available for RF LANs is found at: <http://hydra.carleton.ca/info/wlan.html>
Published by Barry McLanon, VE3JF, it pretty much summarizes what you can buy..
Alan

>Fred -
>I don't have a copy of Network Computing, but would be really appreciative
>if you would E-mail me a list of RF LAN devices PLEASE. If you would rather
>FAX it, I'll give you my FAX number by return E-mail.
>
>Bruce K9BC
>
>At 13:03 1/21/97 -0600, you wrote:
>>I kept an old issue of "Network Computing" because it had a large list
>>of Wireless LANs in it (Dec. 15 1996)..

107. Re: [SS:865] Re: SS of course...

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Wed, 22 Jan 1997 13:41:04 -0500
To: ss@tapr.org
Message-ID: <199701221841.NAA26754@Paris.GASD102designcenter>
Rendered body type: text/plain

> Develop our own. Neat opportunity.
> I've been kicking about the idea of gluing together:
>
> 1. one of those sexy harris PRISM chipsets;
> 2. motorola 68en360;
> 3. a 16M SIMM and a 512K flash;
> 4. AUI or 10-base-T spigot;
> 5. a maintenace/monitor/OA&M RS232 plug.
>
> Use the bdm to debug/re-program the flash.
>
> Estimate:
> 1: \$100?
> 2: 60?
> 3: 100
> 4: 35?
> 5: 5
>
>
> \$300?
>
> misc hw, connectors, board, case: +\$100?

> That's my 2-cents (or \$400) worth...
>
> 73, Gord.
>
>

The PRISM chip set is a good idea. I have two sets of these and I intend to build a simple, yet effective DSSS system. I got the chipsets as samples from a distributor, so if you give them a good reason, you might get them for free (seriously).

The only drawback from this is that now you are designing from a systems level and not detail level. But you still have to know how the thing runs to make it work!

The PRISM chipset is also for use in the 2.4GHz range, so keep that in mind as well. It is microcontroller / microprocessor controlled, so that is an issue as well.

The ideas are endless once you start putting your God-given brain to work.

73s de Tony KE4AT0

108. RE: 871] Re: SS of course...

From: Ralph Ward <rw@txcc.net>
Date: Wed, 22 Jan 1997 16:54:37 -0600
To: "ss@tapr.org" <ss@tapr.org>
Message-ID: <01BC0885.93C58800@port4.txcc.net>
Rendered body type: text/plain

Walmart is selling an "addressable" "phone" that claims to be digital, uninterceptable. It allows any phone or group of phones to be set to com. with each other. Range is "3 blocks". From outside the package, it looks to be a 900MHz part 15 device. Wonder if it's a spread spectrum addressable HT?

From: Lee W. Fry[SMTP:lfry@mindspring.com]
Sent: Tuesday, January 21, 1997 11:50 PM
To: ss@tapr.org
Subject: [SS:871] Re: SS of course...

At 07:55 PM 1/21/97 -0600, Glenn wrote:

>How about a cell phone. These appear to be available under \$10.00 at
>hamfests. The radio is capable of multichannel operation. Is reasonably
>sensitive. Provides 3W output. RX and Tx could be sent to different
>antennas to do away with duplexer. Radios I have seen use dielectricall
>tuned filters and duplexer. These move up in freq easier than down. Just a
>thought.

Or, how about a 900MHz SS wireless phone? I recently got a catalog from Mendelson's Electronics in Dayton OH that had refurb phones for \$50. Some phones have a separate codec and feed 32 or 64kbps data to a 160kbps transceiver section.

Alfa Inc at <http://ns1.2win.com/alfa/wireless.html> is an example of a cordless phone chip set that runs 160kbps half duplex and does time division multiplex to get 64 kbps duplex.

Cylink at <http://www.cylink.com/products/wireless/sseboard.htm> has a similar 160 kbps chip set on an eval board with CODEC chip, a single-chip microcontroller, a 900 Mhz RF module, a telephone line interface, speaker phone and microphone, an RS232 port and a keypad / LCD display for user interface.

So has anybody dissected a SS cordless phone to see what's in it?

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
<http://www.mindspring.com/~lfry/part15.htm>

109. RangelAN

From: Bob Lorenzini <hwm@netcom.com>
Date: Wed, 22 Jan 1997 15:33:46 -0800 (PST)
To: ss@tapr.org
Message-ID: <XFMail.970122155709.hwm@netcom.com>
Rendered body type: text/plain

In the Jan 97 issue of ELECTRONIC PRODUCTS p. 83, is a product highlight on the proxim RangelAN2 7400 PC card (pcmcia). I realise this is probably not a desirable form factor, but what I found interesting was the price/speed.

Also offered:
Range-LAN@ AP-II 7510/7520 access point < looks like a 16bit AT bus card
provides network-management functions and supports the leading
network operating systems."

Proxin, Inc.
Mountain View, CA
information 800-229-1630 / 415-960-1630
<http://www.proxim.com>

The price of the access point was not mentioned, nor is 100 mw much power but I thought it interesting none the less.

110. RE: 874] RE: 871] Re: Wal-mart radios

They are on 900 Mhz and have digital audio. I had a couple apart playing with them. They work like a cellphone without the cellsite. Common data channel, call channel and handoff to empty channel for remainder of conversation. They are very slick TOY radios with a 1 block range, but thats about it.

From: Ralph Ward [SMTP:rw@txcc.net]
Sent: Wednesday, January 22, 1997 6:04 PM
To: ss@tapr.org
Subject: [SS:874] RE: 871] Re: SS of course...

```
begin 600 WINMAIL.DAT
M>Y\^(#4`0:0`$`!`$`0>!@(`Y 0`#H`$(@<`
M&`$E032Y-:-6R;W-O9G0<36%I;`Y.;W1E`$$(0V !`"``@`"$`$$
MD 8`8`$`$`0`P`(`+`+`(`!P\!`-0`
M`"!`Q^DOJ,0&9UN`-T!#U0`"-S0'1A<`(N;W)G`%-5%`<W-=8%P
M<BYO<F<`"@`,$`%`4TU44`>`,`P'0`P`!S<T!T
M87!R+F]R9P`#'!4,0`_@v&`@!,,$`)-W50'1A<`(N
M;(W)G)P`(!`S!`$0`--5% Z4U- 5$%04BY4D<`P.`P'0`
M`'+`$ Z`0`!X!JE\!`#`"-S0'1A<`(N;W)G`(!JU\!`-0`
M`"+`!"Q^DOJ,&9UN`-T!#U0`"-S0'1A<`(N;W)G`%-5%`<W-
M=&%P<BYO<F<`P#]7P5`]/?`(!J)\!`!`
M/O$5@`$@`%)`%B X-X1=(%)#B X-X5=(%)EB!786PM;6%R="!R861I
M;W, UPH!!8 #`X`#-!P$`%@`3`L`P`#&<!`2`P`S0<!`!8
M$P;`!(`P`N`0$)`$`($`"%`135!`#DW-$0P,3$X-C@V-#0T-34S
M-30P,`P`P-D&`0.0!@!X!P`($`L`@`"!PC`$`#"8`
M`L`*0`P`N`"3$`0`<`!00T1&14(P.0`!)`(`3`
M`XH;L0!>40&J&["`K*E;"`!M<W!S="YD;&P`$Y)5$`YO[@!`
M`*H`-]EN`0SI<STE.1$]7AU0Q=71L;V[K+G!S=`8`"N!)!`*F
M<M 1AH9$15-4`"B@`!@`RXSDNR9RT!&&AD1%4U0`+`
M`M`0`$&6HETT!&&AD1%4U0`"8`!213H@`<#T72!213H@`#-072!2
```


end

This way, the Windows standard applications can now talk thru Ham Radio. Whatever that application may be.

I tried dial up networking. I tried Etherax. Neither worked with Windows 95 right off the bat.

On this point, due to the popularity of W95, and lack of RS-232 networking, there might be a product opportunity. Unless, W95-97 has fixed this glaring hole in W95 networking, and added SLIP, or "heaven be praised" KISS. Like Linux has had for years. The product would be a Ethernet in, multiple RS-232 out Dos computer, paired down to minimal board, and maybe a floppy, with 2 megs of memory (if that). That is, something not very high performance, say 200 Kb on each port, FDX, and as cheap as possible, with preinstalled, or floppy bootable NOS.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjin@wb9mjin.ampr.org[44.72.98.19]
Internet: wb9mjin%wb9mjin.ampr.org@uugate.aim.utah.edu

113. Re: [SS:878] Re: Wavelan tcp/ip multipoint?

From: "Dale Heatherington" <wa4dsy@wa4dsy.radio.org>
Date: Thu, 23 Jan 97 10:39:47
To: "ss@tapr.org" <ss@tapr.org>
Message-ID: <m0vnRfo-0001J8C@wa4mei.radio.org>
Rendered body type: text/plain

On Thu, 23 Jan 1997 08:36:13 -0600 (CST), wb9mjin@wb9mjin.ampr.org wrote:

> On this point, due to the popularity of W95, and lack of RS-232 networking,
>there might be a product opportunity. Unless, W95-97 has fixed this glaring
>hole in W95 networking, and added SLIP, or "heaven be praised" KISS. Like
>Linux has had for years.

I'd like to point out that OS/2 Warp's native tcpip has slip. It can be configured to work full time on the serial port without using the dialer. It also has most of the unix networking tools like netstat, ftp, telnet, host, whois, traceroute etc. It's superior to windoze 95 in most other areas as well. It's also cheaper and comes with a lot more "goodies". The popularity of win95 remains a mystery.

Dale Heatherington, WA4DSY
e-mail - wa4dsy@wa4dsy.radio.org
e-mail - daheath@ibm.net (in case the first one doesn't work)
Web page - <http://www.wa4dsy.radio.org>
OS/2 Warp 4.0 The worlds finest desktop OS.

114. Re: [SS:878] Re: Wavelan tcp/ip multipoint?

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Thu, 23 Jan 1997 10:12:00 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.91.970123100312.18917B-100000@tekdata.com>
Rendered body type: text/plain

On Thu, 23 Jan 1997 wb9mjin@wb9mjin.ampr.org wrote:

>
> Hi Bob,
>
> I would think that the problem you have, trying to do TCPIP with Free-
> wave, ie RS-232 port, is similar to the problem I had setting up TCPIP from
> Windows 95, thru to a 9600 baud 440 radio, with KISS Tnc.

>
> In the end, I followed the suggestions of several people to set up an
> ethernet between the W95 box, and a bare bones Dos/NOS computer. The Radio
> link is on the Dos/NOS box, and ethernet'd over to the Windows 95 system,
> using NOS as the software to make it all happen in the Dos computer.

>
You could also use Linux for the second box. When I tried the "beta" AX.25 code way back when (over a year ago) it seemed to work fine.

> This way, the Windows standard applications can now talk thru Ham Radio.
> Whatever that application may be.

>
> I tried dial up networking. I tried Etherax. Neither worked with Windows
> 95 right off the bat.
>
> On this point, due to the popularity of W95, and lack of RS-232 networking,
> there might be a product opportunity. Unless, W95-97 has fixed this glaring
> hole in W95 networking, and added SLIP, or "heaven be praised" KISS. Like
> Linux has had for years. The product would be a Ethernet in, multiple RS-232
> out Dos computer, paired down to minimul board, and maybe a floppy, with 2
> megs of memory (if that). That is, something not very high performance, say
> 200 Kb on each port , FDX, and as cheap as possible, with preinstalled, or
> floppy bootable NOS.

Actually I often thought a good "Next Generation" TNC should be a mini-router, basically what Don described above. Maybe with higher performance serial ports... but the ethernet in is a good idea. Especially with higher speed modem and data, even the 16C550 UARTs get bogged down because of the multitudes of interrupts they generate. Hmm-- a card like the Ottawa card and a couple of the Motorola DSPs cofigured in different modem configs would make one helluva neat multiport packet setup.

Using a scrap 386 or 486 and say Linux to do this would give you a really high-performance box at almost no cost..

Oh, well if only I had the time to do something like this.....:(

Fred M. Spinner, KA9VAW
fred@tekdata.com, KA9VAW@amsat.org

115. RE: [SS:880] Re: Wavelan tcp/ip multipoint?

From: Bob Lorenzini <hwm@netcom.com>
Date: Thu, 23 Jan 1997 10:11:11 -0800 (PST)
To: ss@tapr.org
Cc: "Fred M. Spinner" <fred@tekdata.com>
Message-ID: <XFMail.970123101754.hwm@netcom.com>
Rendered body type: text/plain

>Using a scrap 386 or 486 and say Linux to do this would give you a
>really high-performance box at almost no cost..

It is now possible to embed linux in rom to provide a very elegant router solution with wide protcol support. For some time I have lusted for a ethernet in tnc with a couple of modem headers.

E-Mail: Bob Lorenzini / wd6dod <hwm@netcom.com>
Date: 23-Jan-97
Time: 10:11:15 _____XF-Mail

116. Re: [SS:881] Re: Wavelan tcp/ip multipoint?

From: Steve Stroh <strohs@halcyon.com>
Date: Thu, 23 Jan 1997 12:03:03 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.ULT.3.95.970123120112.8357A-100000@chinoock.halcyon.com>
Rendered body type: text/plain

On Thu, 23 Jan 1997, Bob Lorenzini wrote:

> >Using a scrap 386 or 486 and say Linux to do this would give you a
> >really high-performance box at almost no cost..
>
> It is now possible to embed linux in rom to provide a very elegant router
> solution with wide protcol support. For some time I have lusted for a ethernet
> in tnc with a couple of modem headers.

I've asked about this on ss and tcp-group lists, and there are lots of "Yes, it is possible to embed Linux in ROM (or put it on a single floppy disk) to make an IP router", no one came forward with an example of anyone who WOULD or who HAS done this. It seems more myth than fact at the moment.

Steve

--
Steve Stroh Woodinville, Washington, USA strohs@halcyon.com

117. RE: [SS:882] Re: Wavelan tcp/ip multipoint?

From: Bob Lorenzini <hwm@netcom.com>
Date: Thu, 23 Jan 1997 14:04:06 -0800 (PST)
To: ss@tapr.org
Cc: Steve Stroh <strohs@halcyon.com>
Message-ID: <XFMail.970123145127.hwm@netcom.com>
Rendered body type: text/plain

On 23-Jan-97 Steve Stroh wrote:

>
>I've asked about this on ss and tcp-group lists, and there are lots of
>"Yes, it is possible to embed Linux in ROM (or put it on a single floppy
>disk) to make an IP router", no one came forward with an example of anyone
>who WOULD or who HAS done this. It seems more myth than fact at the
>moment.
>

Steve, in the Jan. issue of "Linux Journl" is an article on how Boeing Flight Test put together a single board 486 without HD that loads and executes linux from eeprom. The application was an operator interface for a monitor and display system. The article gives step by step instructions on how this was accomplished as well as a listing of modified source code.

The latest development kernels now have what is called "rom filesystem support". I quote here in part from the doc's:

"As the name suggests, romfs could be also used (space-efficiently) on various read-only medias, like (E)EPROM disks if someone will have the motivation.. :)

However, the main purpose of romfs is to have a very small kernel, which has only this filesystem linked in, and then can load any module later, with the current module utilities. It can also be used to run some program to decide if you need SCSI devices, and even IDE or floppy drives can be loaded later if you use the "initrd" -- initial ram disk -- feature of the kernel. This would not be really news flash, but with romfs, you can even spare off your ext2 or minix or maybe even affs filesystem until you really know that you need it."

I use a similar technique that boots and loads a complete linux filesystem into ram off of two floppies for rescue/restore purposes. After booting off floppies only, I can mount the HD in my laptop by hand and restore either linux or windog95 partitions from scratch using a dat tape on a pcmcia scsi controller.

I'am not that gifted when it comes to computers but I know I could put together in a few minutes a bootable 2 floppy set that would act as an ax25 router. A one disk solution might be beyond my ability but I believe is doable.

Linux has in the kernel, support for Metricom, WaveLAN, DEC RoamAbout, WIC Radio IP bridge as well as AX25, netrom, BPQ, Ottawa PI, ROSE and others as well as all the common and not so common IP protocols.

Sorry if I carried this somewhat offtopic subject too far but I believe this is very doable project. We linux users tend to get carried away and I know it tends to put people off as that attitude did me when I was first exposed to the "converts".

Bob

E-Mail: Bob Lorenzini / wd6dod <hwm@netcom.com>
Date: 23-Jan-97
Time: 14:04:09 _____ XF-Mail

118. Re: [SS:882] Re: Wavelan tcp/ip multipoint?

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Thu, 23 Jan 1997 17:22:10 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.91.970123171917.20270A-100000@tekdata.com>
Rendered body type: text/plain

On Thu, 23 Jan 1997, Steve Stroh wrote:

>
> On Thu, 23 Jan 1997, Bob Lorenzini wrote:
>
> > Using a scrap 386 or 486 and say Linux to do this would give you a
> > really high-performance box at almost no cost..
> >
> > It is now possible to embed linux in rom to provide a very elegant router
> > solution with wide protocol support. For some time I have lusted for a ethernet
> > in tnc with a couple of modem headers.
>
> I've asked about this on ss and tcp-group lists, and there are lots of

> "Yes, it is possible to embed Linux in ROM (or put it on a single floppy
> disk) to make an IP router", no one came forward with an example of anyone
> who WOULD or who HAS done this. It seems more myth than fact at the
> moment.

Well... it really doesn't matter... you could get a 100mb IDE for asking
at a lot of places, or \$50 if you need to buy. You in fact could do a
working Linux in that amount of space!

Fred M. Spinner, KA9VAW
fred@tekdata.com, KA9VAW@amsat.org

119. Re: [SS:880] Re: Wavelan tcp/ip multipoint?

From: "Steve Sampson" <ssampson@oklahoma.net>
Date: Thu, 23 Jan 1997 19:04:40 -0600
To: <ss@tapr.org>
Message-ID: <199701240109.TAA25637@dns.okc>
Rendered body type: text/plain

> From: Fred M. Spinner <fred@tekdata.com>
> To: ss@tapr.org
> Subject: [SS:880] Re: Wavelan tcp/ip multipoint?
> Date: Thursday, January 23, 1997 10:18 AM
>
> On Thu, 23 Jan 1997 wb9mjn@wb9mjn.ampr.org wrote:
>
>
> > Hi Bob,
> >
> > I would think that the problem you have, trying to do TCPIP with Free-
> > wave, ie RS-232 port, is similar to the problem I had setting up TCPIP from
> > Windows 95, thru to a 9600 baud 440 radio, with KISS Tnc.
> >
> > In the end, I followed the suggestions of several people to set up an
> > ethernet between the W95 box, and a bare bones Dos/NOS computer. The Radio
> > link is on the Dos/NOS box, and ethernet'd over to the Windows 95 system,
> > using NOS as the software to make it all happen in the Dos computer.
> >
> You could also use Linux for the second box. When I tried the "beta" AX.25
> code way back when (over a year ago) it seemed to work fine.

That's an option for 8 Meg or greater machines. NOS works fine in an old 1 Meg or
2 Meg machine. I run mine in 4 Meg, but I like to shell out and do various non-NOS
things. Can't shell out in less than 4 Meg.

I had Linux running in 4 Meg. It isn't pretty, but it'll work if you can't find a copy
of MS/PC-DOS lying around...

I find that JNOS is defective in its ethernet handling however. Not everything comes
back to the socket, and some stuff goes to the remote machines screen. Nothing
critical. As a simple router and mail gateway it is very cost effective.

Steve

120. Re: [SS:882] Re: Wavelan tcp/ip multipoint?

From: "Steve Sampson" <ssampson@oklahoma.net>
Date: Thu, 23 Jan 1997 19:08:42 -0600
To: <ss@tapr.org>
Message-ID: <199701240113.TAA25961@dns.okc>
Rendered body type: text/plain

Absolutely. Someones working on it, but it won't be done this year,
and maybe never. :-) Two years ago several people said they could
put Linux on a floppy for a router. Must be written in machine language,
as it sure is taking a long time :-)

Meanwhile JNOS and older freeware routers are available now.

> From: Steve Stroh <strohs@halcyon.com>
> To: ss@tapr.org
> Subject: [SS:882] Re: Wavelan tcp/ip multipoint?
> Date: Thursday, January 23, 1997 2:08 PM
>
>
> On Thu, 23 Jan 1997, Bob Lorenzini wrote:
>
> > >Using a scrap 386 or 486 and say Linux to do this would give you a
> > >really high-performance box at almost no cost..

```

> >
> > It is now possible to embed linux in rom to provide a very elegant router
> > solution with wide protocol support. For some time I have lusted for a ethernet
> > in tnc with a couple of modem headers.
>
> I've asked about this on ss and tcp-group lists, and there are lots of
> "Yes, it is possible to embed Linux in ROM (or put it on a single floppy
> disk) to make an IP router", no one came forward with an example of anyone
> who WOULD or who HAS done this. It seems more myth than fact at the
> moment.
>
>
> Steve
>
> --
> Steve Stroh Woodinville, Washington, USA strohs@halcyon.com

```

121. Re: [SS:886] Re: Wavelan tcp/ip multipoint?

```

From: Jerry Normandin <jerryn@ici.net>
Date: Thu, 23 Jan 1997 22:17:49 -0500
To: ss@tapr.org
Message-ID: <32E829DD.722C6727@ici.net>
Rendered body type: text/plain

```

Jerry Normandin Writes:

HOLD ON! What have you been smoking? I'm an engineer... I never got my ticket because I disagree with not being able to order a pizza from my 2 meter radio and all the legal restrictions that they put on us....

I have been using Linux to route remote buildings by wireless to our internet backbone for over 6 months now. Linux supports Multipoint... HECK you can never get an unix operating system on a floppy! My Wireless Routers have 1GB each. PLUS they have 16MB of ram. I have two Ethernet Segments on the wireless routers. One is the 10BaseT the other is the Wireless NEC WAVELAN. I am running the Linux_Mobile.router code put out by the folks at MIT. This code can handle both fixed and mobile stations. It can track the routes it should take according to signal strength much like a cellular network.

Data is routed the good old ETHERNET fashion. It doesn't digipeat, it goes from station to station and bangs off each one. Picture this static ip mapping scenario for simplicity's sake Destination is a workstation on a remote3 ethernet scenario... it goes from CentralNET TO WirelessR1 to Wireless2 to Wireless3 and then to ethernet segment remote3. NOTE the static mapping information needs to be entered for each connection... or... you can use RIP like I do. The rip Deamon will make entries for you.

It works for me :) I have two buildings and a van connected :) NOTE: Lucent technologies changed the MAC address on the cards so the standard Linux driver won'd run... I modified my drivers code to wrok with my WaveLAN cards from Lucent.

YOU CAN'T PULL THIS OFF WITH A MICROSLOTH OPERATING SYSTEM! YOU NEED UNIX or LINUX or FreeBSD!

Steve Sampson wrote:

```

>
> Absolutely. Someones working on it, but it won't be done this year,
> and maybe never. :-) Two years ago several people said they could
> put Linux on a floppy for a router. Must be written in machine language,
> as it sure is taking a long time :-)
>
> Meanwhile JNOS and older freeware routers are available now.
>
> -----
> > From: Steve Stroh <strohs@halcyon.com>
> > To: ss@tapr.org
> > Subject: [SS:882] Re: Wavelan tcp/ip multipoint?
> > Date: Thursday, January 23, 1997 2:08 PM
> >
> >
> > On Thu, 23 Jan 1997, Bob Lorenzini wrote:
> >

```

```

> > > Using a scrap 386 or 486 and say Linux to do this would give you a
> > > really high-performance box at almost no cost..
> >
> > > It is now possible to embed linux in rom to provide a very elegant router
> > > solution with wide protocol support. For some time I have lusted for a ethernet
> > > in tnc with a couple of modem headers.
> >
> > I've asked about this on ss and tcp-group lists, and there are lots of
> > "Yes, it is possible to embed Linux in ROM (or put it on a single floppy
> > disk) to make an IP router", no one came forward with an example of anyone
> > who WOULD or who HAS done this. It seems more myth than fact at the
> > moment.
> >
> >
> > Steve
> >
> > --
> > Steve Stroh Woodinville, Washington, USA strohs@halcyon.com

```

122. Re: [SS:885] Re: Wavelan tcp/ip multipoint?

From: wb9mjn@wb9mjn.ampr.org
 Date: Fri, 24 Jan 97 07:17:02 UTC
 To: ss@tapr.org
 Message-ID: <12350@wb9mjn.ampr.org>
 Rendered body type: text/plain

Hi everybody!

Maybe that's why it hasn't been done yet. A surplus 1 meg 386 will do it, for low cost, and the people who can throw that together are the only people who really want it.

Forgot about the mail server requirements. Oops. W95 has no mail servers in it, that I can tell. Just Mail clients, and so far I've only found a PPP XXX Pop mail client. So, the NOS needs to do the Pop mail server as well. Altho, one could get by without a harddrive, with this additional requirement, it sure would be nice. I've yet to start up the Pop server here in the NOS, and just do mail by logging into the NOS on the DOS/Nos box.

So, Anybody considering this has gotta compete against all the junk boxes in the US and Europe. Which is very tuff to do with new equipment.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
 AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
 Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

123. Re: [SS:888] Re: Wavelan tcp/ip multipoint?

From: Jeff King <jeff@mich.com>
 Date: Fri, 24 Jan 1997 11:15:35 -0500
 To: ss@tapr.org
 Message-ID: <2.2.32.19970124161535.006d1178@mail.mich.com>
 Rendered body type: text/plain

At 07:47 AM 1/24/97 -0600, wb9mjn@wb9mjn.ampr.org wrote:

```

>   Forgot about the mail server requirements. Oops. W95 has no mail servers
> in it, that I can tell. Just Mail clients, and so far I've only found a PPP
> XXX Pop mail client. So, the NOS needs to do the Pop mail server as well.
>
>

```

Don:

Check out <http://www.tucows.com>. Lots of WIN95 servers there including SMTP, FTP, HTTPD, POP3, etc... About the only thing I haven't found is a WIN95 router that supports networks.

Regards,

```

-----
| Jeff King      Aero Data Systems |
| jeff@mich.com  P.O. Box 9325    |
| (810)471-1787  Livonia, MI 48151 |
| F(810)471-0279 United States     |
-----

```

124. Re: Linux as router

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Fri, 24 Jan 1997 10:12:13 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.91.970124100351.21481B-100000@tekdata.com>
Rendered body type: text/plain

On Fri, 24 Jan 1997 wb9mjn@wb9mjn.ampr.org wrote:

>
> Hi everybody!
>
> Maybe that s why it hasn t been done yet. A surplus 1 meg 386 will do it,
> for low cost, and the people who can throw that together are the only people
> who really want it.

God, I am a troublemaker! :)

I suggested Linux (or FreeBSD) to do this because it is really versitile,
and will run on a old crap 386. It can support much more then NOS, has
every server in it that you'd want to run, is free and fast.

If you want to run a 8088 and 640k of ram -- use NOS...

geeze...

P.S. someone called Windows 95 "Windog95" -- I think thats an insult
to dogs..

P.P.S. If someone needs old crap equipment.. e-mail me .. I have plenty

Fred M. Spinner, KA9VAW
fred@tekdata.com, KA9VAW@amsat.org

125. Re: [SS:890] Re: Linux as router

From: Jerry Normandin <jerryn@ici.net>
Date: Fri, 24 Jan 1997 15:14:25 -0500
To: ss@tapr.org
Message-ID: <32E91821.167EB0E7@ici.net>
Rendered body type: text/plain

Fred M. Spinner wrote:

>
> On Fri, 24 Jan 1997 wb9mjn@wb9mjn.ampr.org wrote:
>
> >
> > Hi everybody!
> >
> > Maybe that s why it hasn t been done yet. A surplus 1 meg 386 will do it,
> > for low cost, and the people who can throw that together are the only people
> > who really want it.

> God, I am a troublemaker! :)

> I suggested Linux (or FreeBSD) to do this because it is really versitile,
> and will run on a old crap 386. It can support much more then NOS, has
> every server in it that you'd want to run, is free and fast.

> If you want to run a 8088 and 640k of ram -- use NOS...

> geeze...

> P.S. someone called Windows 95 "Windog95" -- I think thats an insult
> to dogs..

> P.P.S. If someone needs old crap equipment.. e-mail me .. I have plenty

> Fred M. Spinner, KA9VAW
> fred@tekdata.com, KA9VAW@amsat.org

I have an FCC Legal wireless infrastructure up with NECWAVELAN
cards operating in the 902-925 range. I use Linux! The wireless
Linux routers are attached to a swiched hub that is attached to a
Cisco 4100 and that's attached to the MCI & SPRINT backbone.

You can't get rocking performance on an old 386. I have four
Pentium 100 machines as wireles routers talking. They are running
the LinuxMobileIP router code from MIT. I would attach the code

here but last time I did the moderator complained so... just use lycos or yahoo and you will find it! All I can say is it even routes mobile! You can get 3 miles on a watt of power. I've created a cellular style cluster with these radios.

Jerry Normandin, iCi Sr. Systems Engineer
Tel.(508)261-0383 x1118
"I'm not only an iCi Staff member, I'm
also a client!"

126. Re: [SS:890] Re: Linux as router

From: John Koster <jkoster@tenet.edu>
Date: Fri, 24 Jan 1997 16:57:56 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.OSF.3.91.970124165536.23283A-100000@gaston.tenet.edu>
Rendered body type: text/plain

On Fri, 24 Jan 1997, Fred M. Spinner wrote:

>
> geeze...
>
> P.S. someone called Windows 95 "Windog95" -- I think thats an insult
> to dogs..

Yes, I agree, I would never say about my golden retriever, what I've said about WIN95.

>
> P.P.S. If someone needs old crap equipment.. e-mail me .. I have plenty
>
Gee, we could start a thread about my old junk is older than your old junk, but lets not. :-)

John, w9ddd@tapr.org

127. Re: [SS:890] Re: Linux as router

From: "NIKOS J. FARSARIS" <njf@lissos.tsinet.gr>
Date: Sat, 25 Jan 1997 13:00:02 -0200
To: ss@tapr.org
Message-ID: <32EA1FF1.72EF@lissos.tsinet.gr>
Rendered body type: text/plain

Fred M. Spinner wrote:
>

> P.S. someone called Windows 95 "Windog95" -- I think thats an insult
> to dogs..

Its a definite insult to dogs! "wildcat" characters and "cat" unix command is an insult to cats too !!

--

NIKOS J. FARSARIS, Dipl. Elec. Eng., Ph.D. Candidate A.U.TH.
RADAR / RF Research, TELECOMMUNICATION SYSTEMS INSTITUTE OF CRETE
(T.S.I.)
37 Iroon Polytechniou Ave, 73133 CHANIA CRETE GREECE
Tel: 30-821-28457/28423 Fax: 28459 E-mail: njf@tsinet.gr, njf@ee.auth.gr

128. Re: [SS:887] Re: Wavelan tcp/ip multipoint?

From: dkelly@hiwaay.net
Date: Fri, 24 Jan 1997 18:34:44 -0600
To: ss@tapr.org
Message-ID: <199701250034.SAA07655@nexgen.HiWAAY.net>
Rendered body type: text/plain

Jerry Normandin Writes:

>
> HOLD ON! What have you been smoking? I'm an engineer... I never
> got my ticket because I disagree with not being able to order a pizza
> from my 2 meter radio and all the legal restrictions that they put on
> us....
>
> I have been using Linux to route remote buildings by wireless to
> our internet backbone for over 6 months now. Linux supports
> Multipoint... HECK you can never get an unix operating system
> on a floppy!

I'm an engineer too. And I learned in the 5th grade, "Never say never because never is never right."

FreeBSD installs from a single 1.2M floppy image. It has enough of the system to 1) partition your hard disk(s), 2) establish a SL/IP or PPP connection out your modem, or direct thru an ethernet card. 3) Network system installation may be by either ftp or NFS. Or you can install off a DOS filesystem, or a CDROM.

Given this example I'd say the only reason there is not a Unix-like single floppy PC-based router/OS on a single floppy is because we haven't found the right combination in an individual that 1) wants it bad enough to do it, 2) has the skills to do it, and 3) has the time to do it.

Personally, once you bite the bullet and decide to place PC hardware out there somewhere, a decent HD is a non-issue. I expect most any modern HD to be more reliable than any floppy. And only a few dollars more.

73,

--

David Kelly N4HHE, dkelly@hiwaay.net

=====

The human mind ordinarily operates at only ten percent of its capacity -- the rest is overhead for the operating system.

129. *nix on floppy

From: Steve Stroh <strohs@halcyon.com>

Date: Sat, 25 Jan 1997 12:58:23 -0800 (PST)

To: ss@tapr.org

Message-ID: <Pine.ULT.3.95.970125123938.14538A-100000@coho.halcyon.com>

Rendered body type: text/plain

On Sat, 25 Jan 1997 dkelly@hiwaay.net wrote:

> Given this example I'd say the only reason there is not a Unix-like single
> floppy PC-based router/OS on a single floppy is because we haven't found
> the right combination in an individual that 1) wants it bad enough to do
> it, 2) has the skills to do it, and 3) has the time to do it.
>
> Personally, once you bite the bullet and decide to place PC hardware out
> there somewhere, a decent HD is a non-issue. I expect most any modern HD to
> be more reliable than any floppy. And only a few dollars more.

The issue isn't so much that hard disks are expensive, fragile, etc. but that a single floppy *nix router makes it easy to get it going and put a decent router on the air. Building a working *nix system is certainly doable, but for much of the amateur population (myself included at the moment), *nix is something of a mystery. If I could order up the "nix floppy from the TAPR Software Library, edit a few config files with callsign, IP address, ports, routes, etc. and then I have a working router, then that's real progress.

Equally acceptable would be an automated (very, VERY automated) install of *nix onto a HD to make a router, where only some config files had to be tweaked to get it working. Putting a minimal implementation of *nix on CD-ROM configured as a router would be OK too.

There are a lot of situations where a full up *nix system with HD (and the attendant full up OS) isn't appropriate not because of location, cost, reliability, but because of available expertise.

What surprises me is that whenever the subject of a 1 floppy *nix IP router is brought up, there's a chorus of "it's easy, works great, sure *nix can do that", but I've not seen any pointers to ANY actual implementations, and I've brought the subject up several times on various lists since last Fall.

The debate is not whether it can be done. I'm convinced that it can. The debate is would anyone actually DO at least a preliminary implementation of it so that those of us who've said we could use such a system could actually try it out and make some constructive comments about it.

Steve N8GNJ

--

Steve Stroh Woodinville, Washington, USA strohs@halcyon.com

130. SS Standard for Amateur Radio

From: hansen@ICSL.UCLA.EDU (Christopher J Hansen)
Date: Sat, 25 Jan 1997 13:11:12 -0800
To: ss@tapr.org
Message-ID: <199701252111.AA23618@xenon.icsl.ucla.edu>
Rendered body type: text/plain

How can I get involved in the development of the TAPR SS standard? I have seen emails on this list describing different ideas, but I'm not sure of any organization.

Chris Hansen, KQ6DW

131. Re: [SS:894] Re: Wavelan tcp/ip multipoint?

From: Jerry Normandin <jerryn@ici.net>
Date: Sat, 25 Jan 1997 17:59:44 -0500
To: ss@tapr.org
Message-ID: <32EA9060.2BD35FA4@ici.net>
Rendered body type: text/plain

dkelly@hiwaay.net wrote:

```
>
>
> Jerry Normandin Writes:
> >
> > HOLD ON! What have you been smoking? I'm an engineer... I never
> > got my ticket because I disagree with not being able to order a pizza
> > from my 2 meter radio and all the legal restrictions that they put on
> > us...
> >
> > I have been using Linux to route remote buildings by wireless to
> > our internet backbone for over 6 months now. Linux supports
> > Multipoint... HECK you can never get an unix operating system
> > on a floppy!
>
> I'm an engineer too. And I learned in the 5th grade, "Never say never
> because never is never right."
>
> FreeBSD installs from a single 1.2M floppy image. It has enough of the
> system to 1) partition your hard disk(s), 2) establish a SL/IP or PPP
> connection out your modem, or direct thru an ethernet card. 3) Network
> system installation may be by either ftp or NFS. Or you can install off a
> DOS filesystem, or a CDROM.
>
> Given this example I'd say the only reason there is not a Unix-like single
> floppy PC-based router/OS on a single floppy is because we haven't found
> the right combination in an individual that 1) wants it bad enough to do it,
> 2) has the skills to do it, and 3) has the time to do it.
>
> Personally, once you bite the bullet and decide to place PC hardware out
> there somewhere, a decent HD is a non-issue. I expect most any modern HD to
> be more reliable than any floppy. And only a few dollars more.
>
> 73,
> --
> David Kelly N4HHE, dkelly@hiwaay.net
> =====
> The human mind ordinarily operates at only ten percent of its
> capacity -- the rest is overhead for the operating system.
Jerry replies:
```

The linux kernel in itself compressed will fit on a floppy as well. BUT YOU NEED MORE in FreeBSD and LINUX to do Mobile routing! You need the /proc file system up. I can fit everything including OS, router code, and SAVE for the IP mapping, MX records for SENDMAIL, and the DNS on a 380MB HD! I have everything working now! THE KERNEL is just one part... granted a major part of the operating system.

Do you have any clue of how much ram Sendmail consumes? You need to have smtp enabled, and popmail on the mail server. This isn't a simple NOS. It's a complete full blown tcp/ip wireless networking package! It's not just a router... I am using the box for other things. If you are not concerned about a cellular style router for mobile communications then I guess you can EASILY make some IOS that only runs RIP. I don't run routed right now... I have static routes entered in my route table until I can fully test the IPMobile_Linux code.

132. Re: [SS:895] *nix on floppy

From: Jerry Normandin <jerryn@ici.net>
Date: Sat, 25 Jan 1997 18:04:06 -0500
To: ss@tapr.org
Message-ID: <32EA9166.745FC205@ici.net>
Rendered body type: text/plain

Steve Stroh wrote:

>
> On Sat, 25 Jan 1997 dkelly@hiwaay.net wrote:
>
> > Given this example I'd say the only reason there is not a Unix-like single
> > floppy PC-based router/OS on a single floppy is because we haven't found
> > the right combination in an individual that 1) wants it bad enough to do
> > it, 2) has the skills to do it, and 3) has the time to do it.
> >
> > Personally, once you bite the bullet and decide to place PC hardware out
> > there somewhere, a decent HD is a non-issue. I expect most any modern HD to
> > be more reliable than any floppy. And only a few dollars more.
>
> The issue isn't so much that hard disks are expensive, fragile, etc. but
> that a single floppy *nix router makes it easy to get it going and put a
> decent router on the air. Building a working *nix system is certainly
> doable, but for much of the amateur population (myself included at the
> moment), *nix is something of a mystery. If I could order up the "*nix
> floppy from the TAPR Software Library, edit a few config files with
> callsign, IP address, ports, routes, etc. and then I have a working
> router, then that's real progress.
>
> Equally acceptable would be an automated (very, VERY automated) install of
> *nix onto a HD to make a router, where only some config files had to be
> tweaked to get it working. Putting a minimal implementation of *nix on
> CD-ROM configured as a router would be OK too.
>
> There are a lot of situations where a full up *nix system with HD (and the
> attendant full up OS) isn't appropriate not because of location, cost,
> reliability, but because of available expertise.
>
> What surprises me is that whenever the subject of a 1 floppy *nix IP
> router is brought up, there's a chorus of "it's easy, works great, sure
> *nix can do that", but I've not seen any pointers to ANY actual
> implementations, and I've brought the subject up several times on various
> lists since last Fall.
>
> The debate is not whether it can be done. I'm convinced that it can. The
> debate is would anyone actually DO at least a preliminary implementation
> of it so that those of us who've said we could use such a system could
> actually try it out and make some constructive comments about it.
>
> Steve N8GNJ
>
> --
> Steve Stroh Woodinville, Washington, USA strohs@halcyon.com
Jerry Replies:

Just get a book on Unix and study. I have absolutely NO PROBLEMS
with running Linux. I have a Linux box connected to the backbone of
an ISP and a Linux box located in a remote building that links that
building to the internet via wireless. We are also capable of hitting
it with a mobile laptop. All authentication is done on our Primary &
Secondary Authentication Servers running Radius.

Heck It works NOW! I'm not debating whether or not I should
make a floppy version. I need a bit more than that to accomplish the
task I am doing because the wireless box does more than just route
from the wireless segment to the ethernet segment. It does more.

133. Re: [SS:898] Re: *nix on floppy

From: "Steve Sampson" <ssampson@oklahoma.net>
Date: Sat, 25 Jan 1997 21:23:21 -0600
To: <ss@tapr.org>
Message-ID: <199701260328.VAA12917@dns.okc>
Rendered body type: text/plain

> Jerry Replies:

>
> Just get a book on Unix and study. I have absolutely NO PROBLEMS
> with running Linux. I have a Linux box connected to the backbone of
> an ISP and a Linux box located in a remote building that links that
> building to the internet via wireless.

Reading this, it sounds like we're headed down the same road that killed packet radio. It sounds like a lot of fun, but what's it for? Packet never progressed beyond keyboard chat and BBS messages. The applications everyone thought about required more bandwidth than available. Packet groups made great strides to create a network, but in the end we couldn't figure out what the network was for.

Is the goal to see how many Linux routers we can invent? How about how many Linux routers we can connect in series? Hmm, how about how many Linux boxes we can flow internet data through a radio?

I think that digital data and networking are what people think of first in SS, but I'm more interested in voice. With SS you have the bandwidth required for some sophisticated voice and data applications. Many years ago I wrote a (not well received) article on TDMA to replace the repeater. With SS the door is open to develop algorithms to replace the central node paradigm of the repeater, and use low level networking to join individual nodes. Something on the order of 10% that of TCP/IP complexity.

Steve

134. Re: [SS:899] Re: *nix on floppy

From: Jerry Normandin <jerryn@ici.net>
Date: Sun, 26 Jan 1997 00:11:04 -0500
To: ss@tapr.org
Message-ID: <32EAE768.1F73D919@ici.net>
Rendered body type: text/plain

Steve Sampson wrote:

>
> > Jerry Replies:
> >
> > Just get a book on Unix and study. I have absolutely NO PROBLEMS
> > with running Linux. I have a Linux box connected to the backbone of
> > an ISP and a Linux box located in a remote building that links that
> > building to the internet via wireless.
>
> Reading this, it sounds like we're headed down the same road that killed packet radio.
> It sounds like a lot of fun, but what's it for? Packet never progressed beyond keyboard
> chat and BBS messages. The applications everyone thought about required more
> bandwidth than available. Packet groups made great strides to create a network, but
> in the end we couldn't figure out what the network was for.
>
> Is the goal to see how many Linux routers we can invent? How about how many
> Linux routers we can connect in series? Hmm, how about how many Linux boxes
> we can flow internet data through a radio?
>
> I think that digital data and networking are what people think of first in SS, but I'm
> more interested in voice. With SS you have the bandwidth required for some
> sophisticated voice and data applications. Many years ago I wrote a (not well
> received) article on TDMA to replace the repeater. With SS the door is open to
> develop algorithms to replace the central node paradigm of the repeater, and
> use low level networking to join individual nodes. Something on the order of
> 10% that of TCP/IP complexity.
>
> Steve
I'm doing voice on Spread Spectrum but the characters in this newsgroup
don't want to hear about it. they want a unix on floppy. I told I
can't do it because I need more than just the kernel.

I use Speak Freely on SS. It works well!

135. Re: [SS:900] Re: *nix on floppy

From: John Koster <jkoster@tenet.edu>
Date: Sun, 26 Jan 1997 08:11:31 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.OSF.3.91.970126073419.218A-100000@gaston.tenet.edu>
Rendered body type: text/plain

On Sat, 25 Jan 1997, Jerry Normandin wrote:

Stuff deleted

> > received) article on TDMA to replace the repeater. With SS the door is open to
> > develop algorithms to replace the central node paradigm of the repeater, and
> > use low level networking to join individual nodes. Something on the order of
> > 10% that of TCP/IP complexity.
> >
> > Steve
> I'm doing voice on Spread Spectrum but the characters in this newsgroup

> don't want to hear about it. they want a unix on floppy. I told I
> can't do it because I need more than just the kernel.
>
> I use Speak Freely on SS. It works well!

Whoa, wait a minute. I thought the mission was to move bits from point A to point B irregardless of what information they represented? Once we get bits flowing out of some connector on the radio, we've made a big step. Since bits R bits, no matter what they represent, some of use have made the assumption (right or wrong?) that they could be routed, processed, etc with some common h/w & s/w as well. Since the internet seems to be an example of where they are able to somewhat successfully move data of all types, TCP/IP has been looked to as a possible way of doing it. *NIX gets more mention from the OS side because there are several flavors where the complete source code is available to those who like to/are able to write code needed to make this stuff work on radio. This means you can pick and choose the parts you need to accomplish your goal and not be bothered by the rest. For example if you don't need a GUI, you don't have to have one taking up space.

I suppose anything other than SS radios is off topic here if we were to be fussy about it. But, since we seem to have little discussion about chips sets, PN codes etc. perhaps a little discussion about how the bits are processed outside the radio won't hurt. Perhaps on topic would be what kind of data connector and data format should the radio have? So far the commercial stuff seems to have either ethernet pipes or RS232 (asynchronous at various speeds). Their choice seems to be related to the speed the radio can move data. Considering how inexpensive ethernet cards and chips set are, and how overloaded the COMM ports are typically on a PC, I'd tend to favor ethernet even on the slower radios.

And what are some of the other ways to move data to/from/between radios besides *NIX and TCP/IP? Inquiring minds are interested.

John, W9DDD
<w9ddd AT tapr DOT org>

136. Re: [SS:898] Re: *nix on floppy

From: Steve Stroh <strohs@halcyon.com>
Date: Sun, 26 Jan 1997 07:49:36 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.ULT.3.95.970126073237.19419A-100000@chinook.halcyon.com>
Rendered body type: text/plain

(This discussion is somewhat relevant to SS- it involves what happens when lots of SS radios start showing up in the hands of average hams and they want to run their Win95 boxes with them? My guess is that they'll need a simple IP router of some kind. Hence the *nix on floppy discussion. I'm assuming that Amateur SS radios, at least initially, won't come with much networking and IP built in. If they did, this discussion would be moot.)

On Sat, 25 Jan 1997, Jerry Normandin wrote:

> Just get a book on Unix and study.

I am. That's an appropriate answer specifically for me. It's not an appropriate answer for hundreds/thousands of hams who would rather communicate and use the equipment than understand its innermost workings. Appliance operators are here- that's fact. If there isn't some easy way for them to network IP, then the Net/ROM crowd will fill the void <shudder>.

> I have absolutely NO PROBLEMS with running Linux.

Glad to hear it- sounds like you're having lots of fun with your system. I don't to either once I get up to speed on it. It's just another OS that I haven't had much experience with yet.

I'm trying to speak for the hundreds/thousands of users of Amateur SS radios who aren't going to want to bother with a full up Linux box, but could make good use of an old beater PC as an IP router by sticking in "*nix on a floppy", editing some parameters as mentioned previously, and they're up an running with their SS radio and their Win95 PC both plugged into the *nix PC.

Steve N8GNJ

--

Steve Stroh Woodinville, Washington, USA strohs@halcyon.com

137. Re: [SS:901] Re: *nix on floppy

From: "Steve Sampson" <ssampson@oklahoma.net>
Date: Sun, 26 Jan 1997 10:20:02 -0600
To: <ss@tapr.org>
Message-ID: <199701261625.KAA09215@dns.okc>
Rendered body type: text/plain

> Whoa, wait a minute. I thought the mission was to move bits from point
> A to point B irregardless of what information they represented?

There's no mission :-). I don't think anyone has decided that the data pipe must carry every conceivable appliance through it (Re: tcp/ip). By the way, there was a program on TV where this company big-wig was showing the reporter how every refridge and oven would have an IP address. You could use your web browser to monitor the kitchen. ho ho.. Talk about overkill, my Grandma is rolling in her grave...

> Once we get bits flowing out of some connector on the radio, we've made a big
> step. Since bits R bits, no matter what they represent, some of use have
> made the assumption (right or wrong?) that they could be routed,
> processed, etc with some common h/w & s/w as well. Since the internet
> seems to be an example of where they are able to somewhat successfully
> move data of all types, TCP/IP has been looked to as a possible way of
> doing it.

Well, a Rolls Royce seems to be an example of a car, but does it really do anything more than a Triumph Spitfire?

> I suppose anything other than SS radios is off topic here if we were to be
> fussy about it. But, since we seem to have little discussion about chips
> sets, PN codes etc. perhaps a little discussion about how the bits are
> processed outside the radio won't hurt. Perhaps on topic would be what
> kind of data connector and data format should the radio have? So far the
> commercial stuff seems to have either ethernet pipes or RS232
> (asynchronous at various speeds). Their choice seems to be related to the
> speed the radio can move data. Considering how inexpensive ethernet
> cards and chips set are, and how overloaded the COMM ports are typically
> on a PC, I'd tend to favor ethernet even on the slower radios.

I guess one way to do this then, is to use your standard talkie and hook your home radio up to an audio card and send it over the internet. I can do that now without spread spectrum??

I don't want any connector. I want to hold it in my hand. Let the base unit have a serial connector. After all, most SS stuff is serial based, or card based. Ethernet is good for a black box connected to the home LAN.

> And what are some of the other ways to move data to/from/between radios
> besides UNIX and TCP/IP? Inquiring minds are interested.

Ciarcia's Circuit Cellar did an interesting series of articles on home networks. This network used twisted pair and interfaced to the BSR line of lamp controllers, thermostats, fire alarms, etc. I think someone actually prodded them to use TCP/IP, but in the end, a simple protocol was developed. One that could fit on a microcontroller, and not require a 1.6 Gig drive or a Pentium Pro :-). It works fine on an 8031 or 80C32 etc.

Picture a cell of Amateurs throughout the city. How does each node find all the other nodes (protocol 1 required). How does each node get to the other node (protocol 2 required). How is the voice digitized and compressed (protocol 3 required). I don't think UDP or TCP is a good option here. I don't think IP is a good option, we can't really expect 4 Billion nodes can we? Let's say maybe 256 people can use one channel. That should only take up 8 bits of address instead of 32 bits, and can even be selected randomly as nodes come online at each radio.

I like the simple protocols for simple problems. You can always interface one to the other at some base unit.

Steve

138. Re: [SS:902] Re: *nix on floppy

From: Richard Parry <rparry@qualcomm.com>
Date: Sun, 26 Jan 1997 09:34:46 -0800
To: ss@tapr.org
Message-ID: <v03007803af114616b2b8@[129.46.92.34]>
Rendered body type: text/plain

Sorry, please tell me with "nix" is?

```
>(This discussion is somewhat relevant to SS- it involves what happens when
>lots of SS radios start showing up in the hands of average hams and they
>want to run their Win95 boxes with them? My guess is that they'll need a
>simple IP router of some kind. Hence the *nix on floppy discussion. I'm
>assuming that Amateur SS radios, at least initially, won't come with much
>networking and IP built in. If they did, this discussion would be moot.)
>
>On Sat, 25 Jan 1997, Jerry Normandin wrote:
>
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>
>I am. That's an appropriate answer specifically for me. It's not an
>appropriate answer for hundreds/thousands of hams who would rather
>communicate and use the equipment than understand its innermost workings.
>Appliance operators are here- that's fact. If there isn't some easy way
>for them to network IP, then the Net/ROM crowd will fill the void
><shudder>.
>
>> I have absolutely NO PROBLEMS with running Linux.
>
>Glad to hear it- sounds like you're having lots of fun with your system.
>I don't to either once I get up to speed on it. It's just another OS that
>I haven't had much experience with yet.
>
>I'm trying to speak for the hundreds/thousands of users of Amateur SS
>radios who aren't going to want to bother with a full up Linux box, but
>could make good use of an old beater PC as an IP router by sticking in
>"*nix on a floppy", editing some parameters as mentioned previously, and
>they're up an running with their SS radio and their Win95 PC both plugged
>into the *nix PC.
>
>Steve N8GNJ
>
>--
>Steve Stroh Woodinville, Washington, USA strohs@halcyon.com
```

```
-----
Richard Parry, P.E., W9IF - Ext 8-4972, Office R-307B
Qualcomm, Inc. Globalstar/Gateway Reverse Link
Intranet --> <http://web/~rparry>
Internet --> <http://www.qualcomm.com/~rparry>
AX.25 --> W9IF@K6JCC.#50CAL.CA.USA.NOAM
-----
```

139. Re: [SS:902] Re: *nix on floppy

From: Jerry Normandin <jerryn@ici.net>
Date: Sun, 26 Jan 1997 13:15:53 -0500
To: ss@tapr.org
Message-ID: <32EB9F59.59DDCC14@ici.net>
Rendered body type: text/plain

Jerry Normandin replies:

I don't run a Microsloth OS! I am running Linux as my operating system. Despite what many "Follow the flock" PC users thing there are drivers for just about everything out there for Linux. My HP855C, My HP Scanjet IICx, the Matrix Millenium Video Card w/4MB RAM.. Plus the software out there is great!!!!!!!!!!!!!!

I can run weather models and produce results similar to what the people at NOAA generate because thier software is on the net and it compiles cleanly for Linux. It's a graphic program and runs under X windows.

The speach recognition software is very accurate. The Net Tools are industrial strenght. PLUS.. the tools the average PC user needs such as destop publishing software, spreadsheet, games... they are all plentiful.

I would think it's an OS that HAMS would enjoy learning! ANY WHY NOT BASE THE AMATURE WIRELESS INFRASTRUCTURE ON IT? I'LL TELL YOU WHY, THE ARRL and OTHERS HAVE THIER HAND IN THE POCKETS OF OTHER AMATURE RADIO COMPANIES. WITH LINUX THERE IS NO NEED FOR A TNC! NO NEED

for some \$2,300.00 router... heck the router can run in the background on your Linux Workstation.

Steve Stroh wrote:

```
>
> (This discussion is somewhat relevant to SS- it involves what happens when
> lots of SS radios start showing up in the hands of average hams and they
> want to run their Win95 boxes with them? My guess is that they'll need a
> simple IP router of some kind. Hence the *nix on floppy discussion. I'm
> assuming that Amateur SS radios, at least initially, won't come with much
> networking and IP built in. If they did, this discussion would be moot.)
>
> On Sat, 25 Jan 1997, Jerry Normandin wrote:
>
> > Just get a book on Unix and study.
>
> I am. That's an appropriate answer specifically for me. It's not an
> appropriate answer for hundreds/thousands of hams who would rather
> communicate and use the equipment than understand its innermost workings.
> Appliance operators are here- that's fact. If there isn't some easy way
> for them to network IP, then the Net/ROM crowd will fill the void
> <shudder>.
>
> > I have absolutely NO PROBLEMS with running Linux.
>
> Glad to hear it- sounds like you're having lots of fun with your system.
> I don't to either once I get up to speed on it. It's just another OS that
> I haven't had much experience with yet.
>
> I'm trying to speak for the hundreds/thousands of users of Amateur SS
> radios who aren't going to want to bother with a full up Linux box, but
> could make good use of an old beater PC as an IP router by sticking in
> "*nix on a floppy", editing some parameters as mentioned previously, and
> they're up and running with their SS radio and their Win95 PC both plugged
> into the *nix PC.
>
> Steve N8GNJ
>
> --
> Steve Stroh Woodinville, Washington, USA strohs@halcyon.com
```

140. Re: [SS:903] Re: *nix on floppy

From: "Dale Heatherington" <wa4dsy@wa4dsy.radio.org>
Date: Sun, 26 Jan 97 14:30:37
To: "ss@tapr.org" <ss@tapr.org>
Message-ID: <m0v0aHo-0001IHC@wa4mei.radio.org>
Rendered body type: text/plain

On Sun, 26 Jan 1997 10:22:15 -0600 (CST), Steve Sampson wrote:

```
>> Whoa, wait a minute. I thought the mission was to move bits from point
>> A to point B irregardless of what information they represented?
>
>There's no mission :-) I don't think anyone has decided that the data pipe
>must carry every conceivable appliance through it (Re: tcp/ip). By the way,
>there was a program on TV where this company big-wig was showing the
>reporter how every refridge and oven would have an IP address. You could
>use your web browser to monitor the kitchen. ho ho.. Talk about overkill,
>my Grandma is rolling in her grave...
```

TCPIP is quite scaleable. I'm rolling my own home control/monitoring system using Z80s and Z8s. The protocol is UDP/IP. This is quite simple using less than 1K of code for the comm stuff. Any device on the system can be "pinged" from any regular tcpip machine with access to the home control subnet. The UDP protocol is connectionless and very simple to impliment. TCP is much more complex but not required this application. I think the concept of a universal protocol which runs on everything from toasters to multimedia web servers is quite appealing. A tcpip tnc shouldn't be too hard to do either.

There's a web server running on a single board x86 rom based computer at <http://smallest.pharlap.com/> It's 3.6x3.8inches in size and is hooked to weather instruments.

My \$.02

Dale Heatherington, WA4DSY
e-mail - wa4dsy@wa4dsy.radio.org
e-mail - daheath@ibm.net (in case the first one doesn't work)
Web page - http://www.wa4dsy.radio.org
OS/2 Warp 4.0 The worlds finest desktop OS.

141. Re: [SS:903] Re: *nix on floppy Nope... need 1.GB HD.

From: Jerry Normandin <jerryn@ici.net>
Date: Sun, 26 Jan 1997 14:47:24 -0500
To: ss@tapr.org
Message-ID: <32EBB4CC.5E92F24D@ici.net>
Rendered body type: text/plain

Jerry Normandin Replies to all:
the Linux Mobile IP protocol is WORKING FOR ME!!!!!!!!!!!!!!!!!!!!
And it works well!

<http://anchor.cs.binghamton.edu/~mobileip/>

142. Re: [SS:903] Re: *nix on floppy

From: John Koster <jkoster@tenet.edu>
Date: Sun, 26 Jan 1997 14:14:41 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.OSF.3.91.970126134435.28491C-100000@Joyce-Perkins.tenet.edu>
Rendered body type: text/plain

On Sun, 26 Jan 1997, Steve Sampson wrote:

> > Whoa, wait a minute. I thought the mission was to move bits from point
> > A to point B irregardless of what information they represented?
>
> There's no mission :-) I don't think anyone has decided that the data pipe
> must carry every conceivable appliance through it (Re: tcp/ip).

The development stage radios should be transparent. Later as things progress, if someone wants to glue some specific application to it and integrate the whole thing in one package fine and dandy.

>
> > Once we get bits flowing out of some connector on the radio, we've made a big
> > step. Since bits R bits, no matter what they represent, some of use have
> > made the assumption (right or wrong?) that they could be routed,
> > processed, etc with some common h/w & s/w as well. Since the internet
> > seems to be an example of where they are able to somewhat successfully
> > move data of all types, TCP/IP has been looked to as a possible way of
> > doing it.
>
> Well, a Rolls Royce seems to be an example of a car, but does it really do
> anything more than a Triumph Spitfire?

Well, since most of us have a limited amount of time, we'd like to make use of something that already exists until we get the SS side of things going good. Using TCP/IP at some level of a system does not require that it be used everywhere. I work with systems that use 3 different protocols at different levels of the system. The lowest level being an asynch polled LAN which could be compared to talking KISS to multiple TNCs. At the next level up it uses token passing SDLC. At the highest level, it can use TCP/IP, Netware, NetBIOS, etc.

>
> > I suppose anything other than SS radios is off topic here if we were to be
> > fussy about it. But, since we seem to have little discussion about chips
> > sets, PN codes etc. perhaps a little discussion about how the bits are
> > processed outside the radio won't hurt. Perhaps on topic would be what
> > kind of data connector and data format should the radio have? So far the
> > commercial stuff seems to have either ethernet pipes or RS232
> > (asynchronous at various speeds). Their choice seems to be related to the
> > speed the radio can move data. Considering how inexpensive ethernet
> > cards and chips set are, and how overloaded the COMM ports are typically
> > on a PC, I'd tend to favor ethernet even on the slower radios.
>
> I guess one way to do this then, is to use your standard talkie and hook your
> home radio up to an audio card and send it over the internet. I can do that now
> without spread spectrum??
Not sure what your point is here. I'm not really interested in sending anything over the internet per se, what I am interested in doing is not

re-inventing the wheel. 'Steal' anything we can, but realize to make it work on radio it will take some tweaking.

>
> I don't want any connector. I want to hold it in my hand.
Not next week, but eventually.

> Ciarcia's Circuit Cellar did an interesting series of articles on home networks.
> This network used twisted pair and interfaced to the BSR line of lamp controllers,
> thermostats, fire alarms, etc. I think someone actually prodded them to use
> TCP/IP, but in the end, a simple protocol was developed. One that could fit
> on a microcontroller, and not require a 1.6 Gig drive or a Pentium Pro :-) It
> works fine on an 8031 or 80C32 etc.

Do you remember which issue(s)?

>
> Picture a cell of Amateurs throughout the city. How does each node find all
> the other nodes (protocol 1 required). How does each node get to the other
> node (protocol 2 required). How is the voice digitized and compressed (protocol
> 3 required). I don't think UDP or TCP is a good option here. I don't think IP
> is a good option, we can't really expect 4 Billion nodes can we? Let's say
> maybe 256 people can use one channel. That should only take up 8 bits of
> address instead of 32 bits, and can even be selected randomly as nodes
> come online at each radio.
>
Fine if the information is going to stay at that one cell. The example I
gave earlier is limited to 32 addresses at the lowest level, 64 at the
next level up....etc. If the radio is transparent to the higher layers,
who cares.

John

143. Re: [SS:906] Re: unix on floppy

From: "Steve Sampson" <ssampson@oklahoma.net>
Date: Sun, 26 Jan 1997 15:02:08 -0600
To: <ss@tapr.org>
Message-ID: <199701262107.PAA22537@dns.okc>
Rendered body type: text/plain

> There's a web server running on a single board x86 rom based computer at
> <http://smallest.pharlap.com/> It's 3.6x3.8 inches in size and is hooked to weather
> instruments.
>
> My \$.02

First of all, that's a really neat web page! Alas, those little suckers aren't what they seem. Let's see... 4 x 4 inches, can't cost much right? Better start saving those 2 cents up though. Most go for about \$800, you can probably talk em down to \$700...

I do like the fact that it isn't unix though. I always thought small real-time OS's are the better way to go in this application.

144. Re: [SS:905] Re: *nix on floppy

From: "Steve Sampson" <ssampson@oklahoma.net>
Date: Sun, 26 Jan 1997 15:17:26 -0600
To: <ss@tapr.org>
Message-ID: <199701262122.PAA23180@dns.okc>
Rendered body type: text/plain

Jerry Normandin <jerry@ici.net> writes:

> I don't run a Microsloth OS! I am running Linux as my operating
> system.

What's a Microsloth OS? I'm sorry, I don't keep up with all the new Operating Systems coming out each year.

> Despite what many "Follow the flock" PC users thing there
> are drivers for just about everything out there for Linux. My
> HP855C, My HP Scanjet IICx, the Matrix Millenium Video Card w/4MB RAM..
> Plus the software out there is great!!!!!!!!!!!!!!!!!!!!

You have entirely too much expendable income :-)

> I'LL TELL YOU WHY, THE ARRL and OTHERS HAVE THIER HAND IN THE
> POCKETS OF OTHER AMATURE RADIO COMPANIES.

Let's not get too excited here. This is just electronics, not capitalism 101...

I'll tell you why many won't try Linux. I'm a Unix Administrator by profession, and I've taken years to get where I am, as far as understanding both the OS and the tools. Linux and Unix are the easy part, getting the system configured to do work is the hard part. Add to that the trials and tribulations of the programmers. This weekend I decided to upgrade my RedHat Linux. I read the manual, booted with the floppy and presto! My system was completely hosed! No problem, I'll just go around and clean things up, I said. Crap, it's really hosed. OK, blow it away and start over!

Suffice to say, the thing actually looked better on upgrade, then it does after a new install! Everything needs to be reconfigured. And it still looks like X windows to me, even if they do call it FVWM95-2...

Now all I need to do is download all the modem tools I had to throw away, because they don't work with this version. Then I have to upgrade the OS probably, because one of the tools requires release 19, and not 18, etc, etc.

So don't go patting yourself on the back just yet there, big boy :-)

Steve

145. Re: [SS:904] Re: Unix on floppy

From: "Steve Sampson" <ssampson@oklahoma.net>
Date: Sun, 26 Jan 1997 15:26:20 -0600
To: <ss@tapr.org>
Message-ID: <199701262131.PAA23614@dns.okc>
Rendered body type: text/plain

Richard Parry <rparry@qualcomm.com> writes:

> Sorry, please tell me with "nix" is?

Unix is a trademark probably. So the author, fearing suit probably, felt that leaving one letter off makes it alright. But the sad fact is, that the following are all trademarks of my company:

*nix
u*x
un*x
uni*

I'll have my lawyers get in touch with all of you :-)

Steve

"Fear of lawyers is right up there with forcible sodomy" - Krusty the Clown

146. Re: [SS:904] Re: *nix on floppy

From: Steve Stroh <strohs@halcyon.com>
Date: Sun, 26 Jan 1997 13:48:31 -0800 (PST)
To: TAPR Spread Spectrum SIG Mailing List <ss@tapr.org>
Message-ID: <Pine.Ult.3.95.970126134548.1367A-100000@chinook.halcyon.com>
Rendered body type: text/plain

On Sun, 26 Jan 1997, Richard Parry wrote:

> Sorry, please tell me with "nix" is?

* typically means a wildcard character, so *nix could mean

Unix
Linux
Xenix
Ultrix
etc.

Generically, any Unix derivative

Steve N8GNJ

--

Steve Stroh Woodinville, Washington, USA strohs@halcyon.com

147. RE: [SS:909] Re: unix on floppy

From: Bob Lorenzini <hwm@netcom.com>
Date: Sun, 26 Jan 1997 15:01:00 -0800 (PST)

To: ss@tapr.org
Message-ID: <XFMail.970126152951.hwm@netcom.com>
Rendered body type: text/plain

On 26-Jan-97 Steve Sampson wrote:
> much grumbling about *nix, OS et all

Steve what I envision is a small SB board with linux in rom, ~4 meg ram, tables in eeprom, ethernet and a couple of serial ports and modem and or SS radio header/interface. The software could be developed on the many linux systems out here. The ethernet is probably the best/easest high speed interface. It could be configured thru either the ethernet or serial ports like normal routers. The user need not know linux or any other operating system. He could simply enter his parameters in a table like a normal tnc but using a more frendly interface.

Why linux? You need not pay a royalty on each box like you would with dos/pharlap/oranyotherembedded-os. All the protocols are available now including the latest roving wireless.

It seems this list is degenerating into an OS war. I know that I myself and others are frustrated over the FreeWave deal. This linux topic is periheral to a SS/modem issue and some would prefer to discuss SS voice issues instead. From the responce to the FW offer however, it does appear there is great interest in a high speed SS/modem router kind of box and that linux could be used to impart to it a great deal of intelligence.

I'am not about to tell anyone what should be discussed in this list, but I for one would now like to hear some SS radio topics discussed here.

my 2 cents worth
Bob - wd6dod

E-Mail: Bob Lorenzini <hwm@netcom.com>
Date: 26-Jan-97
Time: 15:01:03 _____ Mail

148. Re: [SS:911] Re: Unix on floppy

From: Richard Parry <rparry@qualcomm.com>
Date: Sun, 26 Jan 1997 17:32:22 -0800
To: ss@tapr.org
Message-ID: <v03007800af11b5a6ec99@[129.46.92.34]>
Rendered body type: text/plain

Thanks for the clarification. I am a UNIX guru wanna be, I am almost there. Most of my life is spent on a Linux box. BTW, just published article Amateur Radio and Linux in 73 magazine, page 10.

Thanks,

>Richard Parry <rparry@qualcomm.com> writes:
>
>> Sorry, please tell me with "nix" is?
>
>Unix is a trademark probably. So the author, fearing suit probably, felt that
>leaving one letter off makes it alright. But the sad fact is, that the
>following are
>all trademarks of my company:
>
> *nix
> u*x
> un*x
> uni*
>
>I'll have my lawyers get in touch with all of you :-)
>
>Steve
>"Fear of lawyers is right up there with forcible sodomy" - Krusty the Clown

Richard Parry, P.E., W9IF - Ext 8-4972, Office R-307B
Qualcomm, Inc. Globalstar/Gateway Reverse Link
Intranet --> <http://web/~rparry>
Internet --> <http://www.qualcomm.com/~rparry>
AX.25 --> W9IF@K6JCC.#SOCAL.CA.USA.NOAM

149. Re: [SS:895] *nix on floppy

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Sun, 26 Jan 1997 23:57:49 -1000
To: ss@tapr.org
Message-ID: <Pine.GS0.3.93.970126235537.6753A-100000@uhunix4>
Rendered body type: text/plain

At the risk of being off topic for this list, I would like to make some comments regarding the 1 Floppy/ROM UN*X box.

1) I believe the real reason there are not many (any) single floppy / ROM UN*X packages is because there really has not been a need. As several have mentioned, its too easy to setup a cheap (old) PC with a minimal HD (>=20Meg).

2) If you have the disposable income, and ALL you need is routing, you dont waste time with a UN*X box. You buy a router. If you dont have the extra cash, please refer to item #1.

3) On Sat, 25 Jan 1997 dkelly@hiwaay.net wrote:
> If I could order up the "nix floppy from the TAPR Software Library,
> edit a few config files with callsign, IP address, ports, routes, etc.
> and then I have a working router, then that's real progress.

You can purchase the LINUX slackware package on CD. The system comes with a fairly straightforward setup package. There are several options including putting the config files on your hard drive and running the rest of the system (executables) off the CDRom. Once installed, you edit the config files to reflect you needs. (Linux CDs run from \$10 for a basic CD of kernels and apps, to a 4 CD more stuff than youll ever care to see about Linux package for \$40. (Walnut Creek <http://www.cdrom.com/>))

The only snag I can think of is there may not be a precompiled kernel that has the features you need. eg drivers for the Ottawa PI card. If that is a problem, you should be able to ask your local Linux geek to compile one for you. If you dont have a local geek, Ill see what I can do for you.

4) There ain't no free lunch. Even with a minimal install. You still have to understand the basics of Routing, and UNIX to get the system to work.

5) As this is probably more of a netsig topic, I would be happy to discuss it over there or via direct email.

- Paul Beltrani, AH6NU

150. Fw: [SS:911] Re: Unix on floppy

From: "Steve Sampson" <ssampson@oklahoma.net>
Date: Mon, 27 Jan 1997 06:00:03 -0600
To: <ss@tapr.org>
Message-ID: <199701271205.GAA27176@dns.okc>
Rendered body type: text/plain

I guess I can't kid around on ss anymore, as "Bernie the Nazi" has taken over the channel.

See you guys later, it was fun.

Steve, n5owk

> From: Bernie Doehner <bad@uhf.wireless.net>
> To: crull@plano.net; abuse@oklahoma.net; ssampson@oklahoma.net; root@oklahoma.net
> Subject: [SS:911] Re: Unix on floppy (fwd)
> Date: Sunday, January 26, 1997 7:53 PM
>
> Dear System Administrators at Oklahoma.net and Plano.net:
>
> Please inform your user "ssampson" about the inappropriateness and
> illegality of threatening others by email.
>
> Thank you for your cooperation.
>
> Best Regards,
>
> Bernie Doehner
>
>
> ----- Forwarded message -----
> Date: Sun, 26 Jan 1997 15:42:48 -0600 (CST)
> From: Steve Sampson <ssampson@oklahoma.net>

```

> Reply-To: ss@tapr.org
> To: ss@tapr.org
> Subject: [SS:911] Re: Unix on floppy
>
> Richard Parry <rparry@qualcomm.com> writes:
>
> > Sorry, please tell me with "nix" is?
>
> Unix is a trademark probably. So the author, fearing suit probably, felt that
> leaving one letter off makes it alright. But the sad fact is, that the following are
> all trademarks of my company:
>
>      *nix
>      u*ix
>      un*x
>      uni*
>
> I'll have my lawyers get in touch with all of you :-)
>
> Steve
> "Fear of lawyers is right up there with forcible sodomy" - Krusty the Clown
>

```

151. RE: 897] Re: Wavelan tcp/ip multipoint?

```

From: Gwyn Reedy <gwyn@paccomm.com>
Date: Mon, 27 Jan 1997 08:06:40 -0500
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BC0C29.07A0C360@gwyn>
Rendered body type: text/plain

```

What about a 2.88 mb floppy? Probably not in your junkbox, but available and low cost.

Gwyn Reedy, WIBEL
PacComm Packet Radio Systems

gwyn@paccomm.com
<http://www.paccomm.com>

```

-----
From: Jerry Normandin[SMTP:jerry@ici.net]
Sent: Saturday, January 25, 1997 12:10 PM
To: ss@tapr.org
Subject: [SS:897] Re: Wavelan tcp/ip multipoint?

```

Jerry replies:

The linux kernel in itself compressed will fit on a floppy as well.
BUT YOU NEED MORE in FreeBSD and LINUX to do Mobile routing! You need
the /proc file system up. I can fit everything including OS, router
code, and SAVE for the IP mapping, MX records for SENDMAIL, and the DNS
on a 380MB HD! I have everything working now! THE KERNEL is just one
part... granted a major part of the operating system.

Do you have any clue of how much ram Sendmail consumes?
You need to have smtp enabled, and popmail on the mail server.
This isn't a simple NOS. It's a complete full blown tcp/ip
wireless networking package! It's not just a router... I am using the
box for other things. If you are not concerned about a
cellular style router for mobile communications then I guess you
can EASILY make some IOS that only runs RIP. I don't run routed
right now... I have static routes entered in my route table until
I can fully test the IPMobile_Linux code.

```

begin 600 WINMAIL.DAT
M>)\^(BH-`0:0" ` $`~~~~~!`$`~0>0!@`(`~~~Y 0`~~~~~#H`$(@ <`
M&`~~`$E032Y-:6-R;W-09G0@36%I;"Y.;W1E`#$(`0V !`~~~~~@`~~`$
MD 8]`~~~~~$~~~~~P~~, (~~~~+~~\..~~~~~(!_P\!~~~~~0`~~~~~
M`~"!*Q^DOJ,0&9UN`-T!#U0"~~~~~'-S0'1A<'(N;W)G`%--5%`<W- =&%P
M<BYO<F<~~~~~@`", $`~~~~~%~~~~~4TU44`~~~~~>~~,P`0`~~~~~P`~!S<T!T
M87!R+F]R9P`#`!4,`0`~~~~~,_@&`~~~~~@`!, $`~~~~~)W-S0'1A<'(N
M;W)G)P`~~~~~(!"S !~~~~~$0`~~~~~%--5% Z4U- 5$%04BY/4D<~~~~~P`~.0`~
M`~+`$ Z`0`~~~~~(!]@!\!~~~~~!`~~~~~(Y) $ $@ $`*`~~~~~)%B X.3==

```

M(%)E.B!7879E;&%N('1C<"J I<"!M=6QT:7!0:6YT/P`8#0\$%@ ,`#@````T'
M`0`:```@`!@`H`\$`)P\$!((#`X` ``#`-!P\$`&P`(``4`\$P`!`!\$!`0F`0`A
M` ````C0S,T5%1C%"13<U1# Q,3A%03,P,#0P,#4R1D9%-4\$`\*0<!`Y`&`,`@&
M` ``4` ````P`C` ``````#`"8` ``````L`\*0` ``````P`N` ``````#`#8` ````
M`\$` ``.0"@JTC04@R\`1X`<`!` ````*` ````%)%.B X.3==(%)E.B!7879E;&%N
M('1C<"J I<"!M=6QT:7!0:6YT/P` ``7\$`0` ``!8` ````!0 Q2[S_Q[C,E;X1
MT(ZC`\$`%`+_Y:``>`!X,`0` `````,`!-4P` ``@`?#`\$` ````2` ````5VEN9&]W
M<R`]`=WEN+T=W>6X` ````#` ``808; ,G&`,`!Q` )!` ``@`(\$`\$` ``!E` ````5TA!
M55%"3U5403(X.\$U"1DQ/4%!9/U!23T)!0DQ93D]424Y93U522E5.2T)/6`"Q"
M551!5D%)3\$%"3\$5!3D1,3U=#3U-41U=93E)%1419+%<Q0D5,4\$%#0T]-35!!
M0TM%5%)!1` `````` `0D0`0` ``#(%` ``N!0` ``C0@` ``\$Q:1G7<`"1\$0\_P` ``\*0` ``
M%0*D` ``^0%ZP`\*` ``%` 3`U0` ``&-H"L!S973N,@8`!L,"@S(#Q@<3`H`&,P/%`@!P
M<G\$2(!. (NC03#7T`@ C/"=D[%X]X,C4U`H` \*@0VQ`V!N\&<Q,#,4(L`\*%` (,
M`?)C`\$` @5Q`!4`!`H` A@@1RA(#(N.#@@!M` "(!I@;W!P>3@`"E` #8&(!H&QY
M(&XF;P5`"X` @>0AA(&H(=6YK!N!X+!"!B715R=@MP`V`"8&4<L&X<9" 7(?@
M!;!S="Z"/`H4AW!K` `5`=WD#H!)2">!D>2`55%"-\$5,(K50`-` (4&UM#282
M:Q(`!\_!A9&EOHQ(Q(:!E;7,AW&<DL=I` (N!C!: F<"X!02`U@F@`"0` `Z+R]W
M`\*J` ^+BD?`Q`!`J B)`"R%L:0@Q.#`"T6DM,32>-` WP#-` 08PM9,38KL.L#8">@
M8P5` +3&`*Y<P.`L`,`#\$&1@-A.C\*`,`08,@M0@2@20<AZP3@6P`X\$!)S!N6U--
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>`@`]``\$` ````%` ````4D4Z(``````#` ``TT\_3<``.L4`
`
end

152. Re: [SS:910] Re: *nix on floppy

From: Jerry Normandin <jerry@ici.net>
Date: Mon, 27 Jan 1997 10:35:40 -0500
To: ss@tapr.org
Message-ID: <32ECCB4C.167EB0E7@ici.net>
Rendered body type: text/plain

Jerry Normandin Replies:

Microsloth = Microsoft.. you know "Makeing it all make nonesense"
Second of all, My linux box at home does excatly what I want it to do.
Third... What the hell do you think I do for a living?

I am the Sr. Systems Engineer at an ISP. And our ISP is built on
Sun Sparc Equipment. The Wireless is built on Linux, and my workstation
at Work is a Sparc 5, My Station at home is a Linux Box.

As far as expandable income... SO? I went to college.. big deal,
I also have 10 years experience. 34 Years Old. Always keeping up
with new technology... AND SINCE MicroSloth screwed me on a royalty
when I was 26 I have been very ANTI-Microsoft andhave been promoting
alternative operating Systems! SUCH AS LINUX. I can get Linux to do
EXACTLY WHAT I WANT.

Steve Sampson wrote:

>
> Jerry Normandin <jerry@ici.net> writes:
>
> > I don't run a Microsloth OS! I am running Linux as my operating
> > system.
>
> What's a Microsloth OS? I'm sorry, I don't keep up with all the new

> Operating Systems coming out each year.
>
> > Despite what many "Follow the flock" PC users thing there
> > are drivers for just about everything out there for Linux. My
> > HP855C, My HP Scanjet IICx, the Matrix Millenium Video Card w/4MB RAM..
> > Plus the software out there is great!!!!!!!!!!!!!!!!!!!!
>
> You have entirely too much expendable income :-)
>
> > I'LL TELL YOU WHY, THE ARRL and OTHERS HAVE THIER HAND IN THE
> > POCKETS OF OTHER AMATURE RADIO COMPANIES.
>
> Let's not get too excited here. This is just electronics, not capitalism 101..
>
> I'll tell you why many won't try Linux. I'm a Unix Administrator by profession,
> and I've taken years to get where I am, as far as understanding both the
> OS and the tools. Linux and Unix are the easy part, getting the system
> configured to do work is the hard part. Add to that the trials and tribulations
> of the programmers. This weekend I decided to upgrade my RedHat Linux.
> I read the manual, booted with the floppy and presto! My system was
> completely hosed! No problem, I'll just go around and clean things up, I
> said. Crap, it's really hosed. OK, blow it away and start over!
>
> Suffice to say, the thing actually looked better on upgrade, then it does
> after a new install! Everything needs to be reconfigured. And it still looks
> like X windows to me, even if the do call it FVWM95-2..
>
> Now all I need to do is download all the modem tools I had to throw away,
> because they don't work with this version. Then I have to upgrade the OS
> probably, because one of the tools requires release 19, and not 18, etc, etc.
>
> So don't go patting yourself on the back just yet there, big boy :-)
>
> Steve

--
Jerry Normandin, iCi Sr. Systems Engineer
Tel.(508)261-0383 x1118
"I'm not only an iCi Staff member, I'm
also a client!"

153. Re: [SS:900] Re: *nix on floppy

From: Bob Nielsen <nielsen@primenet.com>
Date: Mon, 27 Jan 1997 08:41:17 -0700 (MST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970127083814.1626A-100000@nielsen.tus.primenet.com>
Rendered body type: text/plain

On Sat, 25 Jan 1997, Jerry Normandin wrote:

> I'm doing voice on Spread Spectrum but the characters in this newsgroup
> don't want to hear about it. they want a unix on floppy. I told I
> can't do it because I need more than just the kernel.

I suggest the "*nix on a floppy" discussion be moved to
linux-hams@vger.rutgers.edu, so this list can focus on spread spectrum.
Or maybe it should be moved to /dev/null (bit-bucket for the non-unix
types.)

Bob

Bob Nielsen Internet: nielsen@primenet.com
Tucson, AZ AMPRnet: w6swe@w6swe.ampr.org
 AX.25: w6swe@wb7t1s.az.usa.noam
 http://www.primenet.com/~nielsen

154. Re: [SS:917] RE: 897] Re: Wavelan tcp/ip multipoint?

From: Tim Pozar <pozar@kumr.lns.com>
Date: Mon, 27 Jan 1997 07:57:01 -0800 (PST)
To: ss@tapr.org
Message-ID: <199701271557.HAA27675@kumr.lns.com>
Rendered body type: text/plain

Gwyn Reedy wrote:

> What about a 2.88 mb floppy? Probably not in your junkbox, but available and low cost.

Actually I did do a one floppy router with FreeBSD with a 2.88
floppy. The down side to it was that is was a floppy. They have

a limited read/writes that you can do with these things. Don't expect to have them read perfectly after the 30th time. Also as a router that is all it could do. If I wanted it to be a dns, mail, or anything server, it would have to moved to a hard drive. So for many years I ran my router on a old MFM 40 meg hard drive. Worked great and rebooted much faster than the floppy. :-)

I originally used KA9Q. In fact we started an ISP company using it. Even paid Phil the commercial rate for the package. After we got tired of having to reboot KA9Q once ever couple of days and using cast off boxes with four serial ports, we broke down and bought a Livingston PortMaster.

If all you need to do is basic routing, there is nothing like getting a cheap router like a used Livingston IRX or Cisco 2500. I see folks selling these things used all the time. If you need to do AX.25 there is KA9Q that will work on one floppy very nicely. Again, a floppy has its problems, so if you are going to use a drive anyway get Linux. Easier to maintain remotely and do what you need it to do.

155. Re: [SS:909] Re: unix on floppy

From: Jerry Normandin <jerryn@ici.net>
Date: Mon, 27 Jan 1997 10:28:59 -0500
To: ss@tapr.org
Message-ID: <32ECC9BB.41C67EA6@ici.net>
Rendered body type: text/plain

Steve Sampson wrote:

>
> > There's a web server running on a single board x86 rom based computer at
> > <http://smallest.pharlap.com/> It's 3.6x3.8inches in size and is hooked to weather
> > instruments.
> >
> > My \$.02
>
> First of all, that's a really neat web page! Alas, those little suckers aren't what
> they seem. Let's see... 4 x 4 inches, can't cost much right? Better start
> saving those 2 cents up though. Most go for about \$800, you can probably
> talk em down to \$700...
>
> I do like the fact that it isn't unix though. I always thought small real-time OS's
> are the better way to go in this application.
Jerry Normandin replies:

Gee,

You can build up a Linux Router for LESS than that and have the capability of altering the router, writing new code and perhaps learning something. Oh yeah... that's right it's the 90s and too many of us are lazy. I guess it's time I discontinue the use of this newsgroup.

Jerry Normandin, iCi Sr. Systems Engineer
Tel.(508)261-0383 x1118

"I'm not only an iCi Staff member, I'm
also a client!"

156. Re: [SS:921] Re: unix on floppy

From: "Steven M. Ruiz" <steve@a.crl.com>
Date: Mon, 27 Jan 1997 11:24:08 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.91.970127112111.5121B-100000@bryce.ampr.org>
Rendered body type: text/plain

Gee,

This Jerry, iCi Sr. Systems Engineer, is kinda an angry guy. I wouldn't write anything about him or he might go off on you.

I wonder what Sr. means? Is that an abbreviation for Sir? Maybe he's a knight. Sir Systems Engineer.

Excuse me oh noble one.

Steve, KN6XQ

On Mon, 27 Jan 1997, Jerry Normandin wrote:

>
> Gee,
> You can build up a Linux Router for LESS than that and have
> the capability of altering the router, writing new code and perhaps
> learning something. Oh yeah... that's right it's the 90s and too many
> of us are lazy. I guess it's time I discontinue the use of this
> newsgroup.
> Jerry Normandin, iCi Sr. Systems Engineer

157. Re: [SS:922] Re: unix on floppy

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Mon, 27 Jan 1997 15:35:49 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.91.970127152727.29246B-100000@tekdata.com>
Rendered body type: text/plain

Oops... Forgive me everyone: I'm the one that started this by suggesting
to use Linux as a router. It can be. It doesn't have to be.
Oh, why can't we get along??? :(

BTW, I initially thought it at least bordered on being appropriate for ss..
as the goal here is to make a higher speed, internet like (hopefully,
part of the internet) packet radio system. Routing is kinda important
for that. This is now getting out of hand. Not as bad as saying
UNIX is better than NT to a bunch of educators (which I mistakenly did
for one of my work related groups).. but we are getting into name calling
here which is never productive.... :(

It looks as if there is enough interest in the software aspects
of packet (like the routing, etc.)-- Would I be out of place to suggest
another mailing list at tapr.org for this type of discussion?

Maybe something like networking@tapr.org?

Fred M. Spinner, KA9VAW
fred@tekdata.com, KA9VAW@tapr.org

On Mon, 27 Jan 1997, Steven M. Ruiz wrote:

>
>
> Gee,
>
> This Jerry, iCi Sr. Systems Engineer, is kinda an angry guy. I
> wouldn't write anything about him or he might go off on you.
>
> I wonder what Sr. means? Is that an abbreviation for Sir? Maybe he's
> a knight. Sir Systems Engineer.
>
> Excuse me oh noble one.
>
>
> Steve, KN6XQ
>
>
>
> On Mon, 27 Jan 1997, Jerry Normandin wrote:
>
> >
> > Gee,
> > You can build up a Linux Router for LESS than that and have
> > the capability of altering the router, writing new code and perhaps
> > learning something. Oh yeah... that's right it's the 90s and too many
> > of us are lazy. I guess it's time I discontinue the use of this
> > newsgroup.
> > Jerry Normandin, iCi Sr. Systems Engineer
>
>
>

158. TAPR NetSig, was: unix on floppy

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Mon, 27 Jan 1997 12:34:41 -1000
To: ss@tapr.org

Message-ID: <Pine.GSO.3.93.970127123126.18777A-100000@uhunix4>
Rendered body type: text/plain

On Mon, 27 Jan 1997, Fred M. Spinner wrote:

> It looks as if there is enough interest in the software aspects
> of packet (like the routing, etc.)-- Would I be out of place to suggest
> another mailing list at tapr.org for this type of discussion?
>
> Maybe something like networking@tapr.org?

There is such a list. Check out the NetSig info at the TAPR web site.
<http://www.tapr.org/tapr/html/sigs.html>
<ftp://ftp.tapr.org/tapr/SIG/netsig/netsig.info>

- Paul Beltrani, AH6NU

159. Re: [SS:924] TAPR NetSig, was: unix on floppy

From: Steve Stroh <strohs@halcyon.com>
Date: Mon, 27 Jan 1997 15:50:06 -0800 (PST)
To: TAPR Spread Spectrum SIG Mailing List <ss@tapr.org>
Message-ID: <Pine.ULT.3.95.970127154535.22457B-100000@chinook.halcyon.com>
Rendered body type: text/plain

On Mon, 27 Jan 1997, Paul A Beltrani wrote:

> > Maybe something like networking@tapr.org?
>
> There is such a list. Check out the NetSig info at the TAPR web site.
> <http://www.tapr.org/tapr/html/sigs.html>
> <ftp://ftp.tapr.org/tapr/SIG/netsig/netsig.info>

I'll second that notion. For those that are web-challenged, via e-mail
you can subscribe by sending a message to:
listproc@tapr.org
with the following in the body of the message (no subject required):
subscribe netsig <firstname> <lastname>

NetSIG has probably gotten something of a reputation as the place to
discuss Net/ROM'ish type networking, but this type of discussion (IP
routers, ad nauseum) is VERY welcome on NetSIG.

Steve N8GNJ
TAPR NetSIG chairperson

--

Steve Stroh Woodinville, Washington, USA strohs@halcyon.com

160. RE: 923] Re: unix on floppy

From: efbrya - Eric Bryan <efbrya@acxiom.com>
Date: Mon, 27 Jan 1997 19:15:20 -0600
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <c=US%a=_%p=Acxiom_Corporati%l=PO-CONWAY-1-970128011520Z-6205@po-conway-1.conway.acxiom.com>
Rendered body type: text/plain

Why not use MINIX? That runs from a floppy and runs on XTs and ATs as
well. Those are almost free for the asking now. 'Nuther option is
FREEDOS though I don't know how far along it is yet.

Eric Bryan
efbrya@acxiom.com

>
>

161. Re: [SS:915] Re: *nix on floppy

From: cape.net@surfergirl.spacey.net
Date: Mon, 27 Jan 1997 22:24:25 -0500 (Eastern Standard Time)
To: ss@tapr.org
Message-ID: <199701280324.WAA00184@surfergirl.spacey.net>
Rendered body type: text/plain

At 03:59 AM 1/27/97 -0600, you wrote:
>At the risk of being off topic for this list, I would like to make some
>comments regarding the 1 Floppy/ROM UN*X box.
>

>1) I believe the real reason there are not many (any) single floppy / ROM
>UN*X packages is because there really has not been a need. As several
>have mentioned, its too easy to setup a cheap (old) PC with a minimal HD
>(>=20Meg).
>
>2) If you have the disposable income, and ALL you need is routing, you
>dont waste time with a UN*X box. You buy a router. If you dont have the
>extra cash, please refer to item #1.
>
>3) On Sat, 25 Jan 1997 dkelly@hiwaay.net wrote:
>> If I could order up the "*nix floppy from the TAPR Software Library,
>> edit a few config files with callsign, IP address, ports, routes, etc.
>> and then I have a working router, then that's real progress.
>

What does this have to do with Amateur Spread Spectrum?!? If we are to move
forward,
then let's discuss SS issues, not whether you want a Linux box!

162. WaveLAN Performance (Was: *nix on floppy)

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Tue, 28 Jan 1997 04:54:24 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199701280454.EAA12672@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

cape.net@surfergirl.spacey.net wrote:
> What does this have to do with Amateur Spread Spectrum?!? If we are to move
> forward,
> then let's discuss SS issues, not whether you want a Linux box!

Indeed, I think it's time to put this wayward thread to rest.

Getting back to SS, a number of folks acquired bargain-basement
900 MHz WaveLAN cards last summer - how about some reports on how
they've worked out? Unfortunately, winter caught up with me before
I got any 900 MHz antennas up, so all I can report is that they work
quite nicely across the room. :-) What kind of ranges and throughputs
have been achieved? What about driver issues? I've heard reports
that the WaveLAN driver for Linux doesn't work with recent kernel
versions - any experience out there?

Barry

--

Barry McLarnon VE3JF/VA3TCP	Internet: bm@hydra.carleton.ca
Ottawa Amateur Radio Club	AMPRnet: bm@lynx.ve3jf.ampr.org
Packet Working Group	Web: http://hydra.carleton.ca

163. Re: [SS:928] WaveLAN Performance (Was: *nix on floppy)

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Tue, 28 Jan 1997 01:24:27 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.970128011556.12815B-100000@uhf.wdc.net>
Rendered body type: text/plain

> Indeed, I think it's time to put this wayward thread to rest.

Second that!

> have been achieved? What about driver issues? I've heard reports
> that the WaveLAN driver for Linux doesn't work with recent kernel
> versions - any experience out there?
>

Can't comment about the Linux ISA driver. I can just say that the
wavelan driver from pcmcia-cs-2.9.0 works really well with kernel 2.0.27.

I am involved with a FreeBSD developer in Australia and a professor at
Portland State University in testing/developing the FreeBSD 2.2
driver for Wavelan. I am presently running this wavelan driver under
2.2-BETA without any problems except that you can't set the IRQ with the
kernel quite yet (a checksum calculation routine needs to be fixed).

Within my house I consistently get 190 kbyte/second ftp transfer speeds
when transferring large files and there are only two stations active.

I haven't yet gotten to the point of trying out outdoor.

164. Re: [SS:929] Re: WaveLAN Performance (Was: *nix on floppy)

From: Jerry Normandin <jerryn@ici.net>
Date: Tue, 28 Jan 1997 14:12:17 -0500
To: ss@tapr.org
Message-ID: <32EE4F91.3F54BC7E@ici.net>
Rendered body type: text/plain

Jerry Normandin Replies:

If anyone ever payed attention to my previous posts you'd notice that I had to modify the Linux driver for Wavelan because many of the new cards are manufactured by Lucent technologies and THEY changed the MAC address. The MAC address is checked upon driver initialization and if the MAC don't match the driver does not load. I rewrote my driver and it works fine!!!!!!!!!!!!!!

And to the turkey asking what Sr. stands for it's Senior

Bernie Doehner wrote:

>
> > Indeed, I think it's time to put this wayward thread to rest.
>
> Second that!
>
> > have been achieved? What about driver issues? I've heard reports
> > that the WaveLAN driver for Linux doesn't work with recent kernel
> > versions - any experience out there?
> >
>
> Can't comment about the Linux ISA driver. I can just say that the
> wavelan driver from pcmcia-cs-2.9.0 works really well with kernel 2.0.27.
>
> I am involved with a FreeBSD developer in Australia and a professor at
> Portland State University in testing/developing the FreeBSD 2.2
> driver for Wavelan. I am presently running this wavelan driver under
> 2.2-BETA without any problems except that you can't set the IRQ with the
> kernel quite yet (a checksum calculation routine needs to be fixed).
>
> Within my house I consistently get 190 kbyte/second ftp transfer speeds
> when transferring large files and there are only two stations active.
>
> I haven't yet gotten to the point of trying out outdoor.
>
> Bernie

--

Jerry Normandin, iCi Sr. Systems Engineer
Tel.(508)261-0383 x1118
"I'm not only an iCi Staff member, I'm
also a client!"

165. Re: [SS:929] Re: WaveLAN Performance (Was: *nix on floppy)

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Wed, 29 Jan 1997 04:43:47 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199701290443.EAA17077@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

Bernie Doehner <bad@uhf.wireless.net> wrote:

> I am involved with a FreeBSD developer in Australia and a professor at
> Portland State University in testing/developing the FreeBSD 2.2
> driver for Wavelan. I am presently running this wavelan driver under
> 2.2-BETA without any problems except that you can't set the IRQ with the
> kernel quite yet (a checksum calculation routine needs to be fixed).
>
> Within my house I consistently get 190 kbyte/second ftp transfer speeds
> when transferring large files and there are only two stations active.

That's impressive. I tried the WaveLAN packet driver and JNOS, and only got about 70 kbytes/s. This was with the TCP window equal to the MSS - if I opened up the window to a multiple of MSS, the throughput nosedived to near-zero. I got the impression that JNOS

wasn't keeping the pipe filled, so carrier would drop briefly between outgoing segments, causing the receiving end to ACK and collide with the next segment. Or maybe WaveLAN is doing something strange at the link layer which interacts badly with the upper layers, or maybe the packet driver is just plain broken. Anybody got a handle on that?

Barry

--

Barry McLarnon	VE3JF/VA3TCP		Internet:	bm@hydra.carleton.ca
Ottawa Amateur Radio Club			AMPRnet:	bm@lynx.ve3jf.ampr.org
Packet Working Group			Web:	http://hydra.carleton.ca

166. The point of the SS group buy

From: Jeff King <jeff@mich.com>
Date: Wed, 29 Jan 1997 18:30:40 -0500
To: ss@tapr.org, ss-sig@tapr.org
Message-ID: <2.2.32.19970129233040.00725f30@mail.mich.com>
Rendered body type: text/plain

I've watched with varying levels of irritation as the group buy dissolved between TAPR and FreeWave.

Getting past this (which I think I've just about done), I got to thinking what exactly is the point of this group buy? We hear (but I've yet to see anything in print) that TAPR is involved with a NSF grant to develop spread spectrum technology. We've seen some group purchases do well... the Garmin GPS module and the Motorola DSP EVM56 kit. Both of these purchases were "non threatening" to the host company. I.E. TAPR was not a competitor. In Garmin's case the TAPR membership would have been perceived as a user base and in Motorola's case it would be developing a pool of DSP developers on the 56 series chips. FreeWave apparently perceived TAPR as a potential competitor in the marketplace, among other things, we are told.

My point here is if indeed it is TAPR's goal to develop its own SS technology, I can see the same thing happening again. More importantly, since it is TAPR's position that it is a volunteer organization, it would be best to train the membership to understand SS concepts and hardware. It seems to me the best way to do this is to work with open systems... either one of the Eval boards from Harris (PRISM) or other companies or a more open system like the ATT/Lucent WaveLan boards (which, BTW, has LINUX drivers).

It's my vote for TAPR to pursue a eval kit from one of the SS chip makers. With some of them they even give you the radio hardware, so these eval kits are fairly close to plug and play. We won't run into any non-disclosure issues as clearly TAPR's success is would be the chip maker's success. In this way we can further TAPR's goal(?) in the NSF contract by developing a pool of experts within TAPR.

Agree or Dis-agree?

Regards,

| Jeff King Aero Data Systems |
| jeff@mich.com P.O. Box 9325 |
| (810)471-1787 Livonia, MI 48151 |
F(810)471-0279 United States

167. (no subject)

From: Les Tacke <Lest@worldnet.att.net>
Date: Wed, 29 Jan 1997 19:32:29 -0600
To: ss@tapr.org
Message-ID: <32EFA2D.1053@worldnet.att.net>
Rendered body type: text/plain

UNSUBSCRIBE

168. Re: [SS:932] The point of the SS group buy

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Wed, 29 Jan 1997 16:01:09 -1000
To: ss@tapr.org

Message-ID: <Pine.GS0.3.93.970129155945.6099A-100000@uhunix4>

Rendered body type: text/plain

> I've watched with varying levels of irritation as the group buy
> dissolved between TAPR and FreeWave.
>
> Getting past this (which I think I've just about done), I got to
> thinking what exactly is the point of this group buy? We hear (but
>
>
> My point here is if indeed it is TAPR's goal to develop its own
> SS technology, I can see the same thing happening again. More
>
> SS concepts and hardware. Its seems to me the best way to do this
> is to work with open systems... either one of the Eval boards from
> Harris (PRISM) or other companies or a more open system like
> the ATT/Lucent WaveLan boards (which, BTW, has LINUX drivers).
>
> Its my vote for TAPR to persue a eval kit from one of the SS chip
> makers.
>
> Agree or Dis-agree?

Developing a project from an eval kit would be much easier than starting from scratch. Is someone who has the authority to speak for TAPR willing to pursue it?

I believe we would be doing a service to the Amateur community if we developed a kit or cookbook design that could be built by anyone with some basic skills. (Much like the original TNC) I would be willing to volunteer my time to assist with such a project.

- Paul Beltrani, AH6NU

169. (no subject)

From: clearbrook_technical@mindlink.bc.ca

Date: Wed, 29 Jan 1997 23:40:46 -0800

Message-ID: <199701300740.XAA10544@linux.clrtech.com.>

Rendered body type: text/plain

[Empty message body]

170. Re: [SS:932] The point of the SS group buy

From: rlanier@su102s.ess.harris.com (Tony Lanier)

Date: Thu, 30 Jan 1997 08:00:49 -0500

To: ss@tapr.org

Message-ID: <199701301300.IAA11501@Paris.GASD102designcenter>

Rendered body type: text/plain

> Its my vote for TAPR to persue a eval kit from one of the SS chip makers.
> With some of them they even give you the radio hardware, so these
> eval kits are fairly close to plug and play. We won't run into any
> non-disclosure issues as clearly TAPR's success is would be the
> chip maker's success. In this way we can further TAPR's goal(?) in
> the NSF contract by developing a pool of experts within TAPR.
>
> Agree or Dis-agree?
>
> Regards,
>
> -----
> | Jeff King Aero Data Systems |
> | jeff@mich.com P.O. Box 9325 |
> | (810)471-1787 Livonia, MI 48151 |
F(810)471-0279 United States
>
>

While pursuing the eval kit direction would be a good learning experience, it really will not establish Amateurs on the "cutting edge" of SS technology. I feel a better route would be to develop a SS radio that is easy to build (no harder than the TAPR DSP-93 kit), but one that allows enough hooks in it to let the more experienced ham expand on the original design. This way we will be able to ask the "What If" and "Why" questions directly to those involved in the kit.

The Harris PRISM chipset is a good idea, but again we would be designing from a systems point-of-view. I feel more amateurs would understand the complexities of SS better if the radio is built in a modular fashion and explain WHY we are designing it this way as opposed to that way.

Once we come up with a basic block diagram, the pieces should fall (relatively) easy into place.

73s de Tony KE4ATO

171. Re: [SS:934] Re: The point of the SS group buy

From: John Hansen <hansen@ait.fredonia.edu>
Date: Thu, 30 Jan 1997 11:01:12 -0500
To: ss@tapr.org
Message-ID: <32F0C5C8.567B@ait.fredonia.edu>
Rendered body type: text/plain

First of all kudos to Jeff King for his efforts to steer the discussion onto a productive path. I think he's absolutely right. I'm really responding to Paul's comments about raising the money to undertake such a project.

Frankly, I don't think money is the problem. Look at the number of people who, just a few weeks ago, were willing to shell out \$800 for a pair of these radios. Personally, I would be willing to start the ball rolling by donating at least \$100 (and more if necessary) to this project to purchase parts and so forth with no expectation of getting anything in return except perhaps some education. I suspect that there are at least a dozen others on this group who would do the same.

Furthermore, organizational talent isn't really the stumbling block either. TAPR has certainly organized substantially larger projects and is legendary for it's low overhead.

The problem as I see it is finding the folks who can take these resources and design a system of moderate cost that can be replicated by the rest of us. Do we have people who are both competent to do this type of work and have the time to accomplish it? If so, this might not be a way to become rich, but it certainly would make you famous.

John WA0PTV

172. Good work so far, TAPR!

From: Randy Roberts <randyrf@sss-mag.com>
Date: Thu, 30 Jan 97 08:34 PST
To: ss@tapr.org
Message-ID: <2.2.16.19970131003335.24cf81e2@sss-mag.com>
Rendered body type: text/plain

I've been reading the "mail" on this group for about six weeks now and I think it's time that I made a comment -- so here goes:

Randy Roberts' (KC6YJY) Ideas, Thoughts and Suggestions re: TAPR SS STA

KC6YJY Congratulates TAPR on a Job Well Done!

NOTE: Spread Spectrum (SS) communications is not new to Ham Radio -- indeed, Ham efforts go back to at least the early 1980's (see the ARRL Spread Spectrum Sourcebook). Dedicated Hams, including Buaas and his STA (Special Temporary Authority) team have recently paved the way for wider Ham Radio usage of this emerging technology. TAPR's recent successful FCC request for changes to the FCC rules regarding Spread Spectrum opens up amateur radio SS experimentation to a much wider, organized group of very capable Hams. It seems that anyone interested may join in TAPR's effort -- I hope that a lot of the world's Hams do join in. The more folks supporting this effort, learning about this technology and just plain "helping out" will ensure that Ham Radio enters the next millenia equipped to stave off more commercial intrusions into our precious frequency bands. Only by activities like this can Ham Radio stay alive, active and healthy. TAPR has led numerous other efforts in Packet Radio, in Ham Radio's use of DSP Techniques and providing a forum for experimentation, discussion and comradery in the past. TAPR now will take the lead in getting Hams to use SS techniques. I heartily congratulate TAPR on their success with this STA and thank the society for their hard work! Best of luck AND we would like to help you in any way we can.

This article presents the original work of Randy Roberts (KC6YJY, ex-WA6BFN) regarding the subjects herein addressed. Spread Spectrum Scene Online and RF/Spread Spectrum consulting join our leader in hoping for a very successful outcome from TAPR's endeavors and we pray that Ham Radio finally catches on and "Tunes In" to Spread Spectrum.

INTRODUCTION

Are you ready for it? Here is a real challenge for Ham Radio! TAPR's new Spread Spectrum STA is a chance to radically modernize the way Ham Radio works, communicates, and THINKS. By adopting a very enlightened position and pushing for technical progress, TAPR is challenging Ham Radio to enter the 21st Century with a NEW SET of tools and high tech capabilities.

How can you get ready for this STA? Hams have a very few choices to get on the bandwagon with this new technology:

- (1) Acquire commercial Wireless LAN or other commercial / military SS equipment, modify it for Ham use and get going -- this may be the most expensive route, but it's quick and can get the job done!
- (2) Modify existing Ham Radio gear for SS capability -- perhaps a tricky and sub-optimal approach.
- (3) Design and develop new equipment designed from scratch to utilize SS techniques -- probably the least expensive, but most time consuming route!
- (4) Wait till the Japanese start marketing Radios with SS capability built-in -- easy, simple, but this could take a LONG wait!

My guess is that smart Hams like the folks in TAPR have already seen the wisdom of choice number (3) and have joined forces to make a group effort in this direction. I haven't read any announcements on this subject yet, but it is the most logical way to go. I suppose we all must just wait and see what TAPR does in this direction. In the mean time, what do we do to utilize SS techniques?

As for approach (1) I can help some legitimate, organized group a little -- I have a GRE GINA, 900 MHz DS 1 Watt radio (which I designed for them some 5 years ago) which is fully functional that I would be willing to donate. Just email me some info about your group and tell me how you plan to use it, first come - first served, since there is ONLY one unit!

Approach (2) may be viable for a Ham (or a group of Hams) with significant DSP design capabilities -- but most of us are probably just not capable of succeeding with this approach. I suggest that the BEST way for most of us to go is approach (3) -- design something new!

A new IC from Norway may provide a cheap, quick and dirty solution to "roll your own" SS radio.

*** see figure at <http://sss-mag.com/rfic.gif> -- this is a picture of the Gran-Jansen a.s. GJRF01 Single Chip RF Transceiver. ***

But, if 1200 bps is not fast enough and you want something more then we need to start with a fresh, clean sheet of paper . . .

Another easily adapted SS chipset is the AMI WavePlex:

*** see figure at <http://sss-mag.com/amiblk.gif> -- this is a picture of the AMI SX043 Direct Sequence Spread Spectrum Transceiver Chip Set. ***

Of course, like many other commercial SS ICs on the market, the AMI chipset was designed for the IEEE 802.11 standard! Is this the standard that Ham Radio needs and wants? I personally don't think it is! So what do we do now?

Any time a new design is contemplated, a number of questions naturally arise:

- What should the new SS radio / modem do?
- What band should it use?
- Should it use DS or FH?
- What communication protocols should it use?
- What computer interface should it have?

- How much power, what bandwidth, what data rate, what channel coding, what modulation, . . . etc?

As you can see, some or all of these questions are very FUNDAMENTAL, if we really want to COMMUNICATE with somebody else! In a nutshell, to exploit SS we need SOME STANDARDIZATION!

Over the years Hams have evolved standards for SSB, CW, RTTY, SSTV, Packet, AM, Satellite, and other modes of communication. Some of these standards arose naturally through usage, some came about from equipment manufacturers building "more or less standardized" radios and still other standards were put forward by groups like TAPR. So isn't it natural to want to standardize SS communications before we design, build or buy a bunch of new equipment?

HAM SS COMMUNICATIONS STANDARDIZATION

With TAPR taking the lead role on this STA, I strongly believe that standardization will happen. Part of TAPR's SS team has experience helping to define the IEEE 802.11 Wireless LAN standard. Thus, if any group is capable of setting a standard for Ham SS, TAPR is! This standardization effort should be done before there is any real widespread Ham Radio use of SS -- otherwise, SS hams may just be talking to themselves!

OK we need to standardize -- but, on what modes, on what applications and at what level of detail? SS communications is quite a bit different than the standard existing modes of amateur radio communications. SS has characteristics that make it more like an extended set of radio (or on the air) interfaces along with something like packet radio parameters. Both the SS on the air characteristics AND the various SS layers of OSI-like protocols and "layers" need to be specified to make a standard useful. I'm no expert at the OSI-layer definition, but I can offer a few thoughts on the other side of "on the air" SS characteristics.

I strongly feel that an "open" standard should be adopted. By this I mean that any standard set for Ham Radio SS should allow for a multitude of applications from replacing slower speed packet radio communications, to Internet / WWW communications, to digital voice, to very narrowband communications for satellite and EME. In short, a new SS standard should allow for a range of on the air parameters, various modes of communications and various data rates / modulation schemes.

While no one radio (or SS radio / modem) may ever be designed to do everything in the standard, the standard should encompass:

- (1) Data rates from a few baud to perhaps 250 kbps.
- (2) Occupied (-20 dB bandwidth) RF bandwidths from 1 kHz to perhaps 3 MHz.
- (3) BPSK, DPSK, QPSK, DQPSK, OQPSK, GMSK, FSK, and perhaps other carrier modulations.
- (4) Direct Sequence (DS), Frequency Hop (FH) and Hybrid Pseudo Random / Pseudo Noise (PN) modulations.
- (5) CDMA, FDMA, TDMA and hybrid combinations for multiple access.
- (6) Optional features should include FEC, automatic message forwarding, use of repeaters, interfaces to GPS / APRS and others to be determined.

I believe the standard should not limit what can be done with SS, but should be Open ENOUGH to encourage experimentation, variants, offshoots, improvements and afterthoughts. With this in mind, it is apparent that compiling, composing and maintaining this new standard is a very big job! I am certain that TAPR (perhaps with ARRL help) is up to the task. If we all support TAPR's efforts and lend whatever expertise and "sweat" we can, then such a standard may stand the test of time and provide a real direction for Amateur Radio SS in the future.

THE FUTURE OF HAM SS COMMUNICATIONS?

In the not too distant future, Ham SS operation may be as routine as Packet Radio is today. But, we have a long way to go to get to that point, don't we? TAPR will need everyone's help they can get to make this effort succeed. Ham radio needs to make a commitment for positive change,

not just sit back with our aging communications technologies. This commitment for change is absolutely needed if we are not to see our "exclusive" frequency bands auctioned out from under us! This commitment means we all must do our part -- so join TAPR if you are not now a member, sign up to participate in the STA if you haven't already done so and finally, quit talking about change and do something to make it happen!

de: Randy Roberts, KC6YJY, ex-WA6BFN, El Granada, CA -- December 11, 1996

Post Script: Since this article first appeared at:
<http://sss-mag.com/hamss.html>,
a lot has happened (as you all know) with TAPR's SS efforts. It appeared that FREEWAVE would provide an easy and inexpensive way for a lot of Hams to get on the air with FHSS -- but alas that deal fell through! Perhaps this was a blessing in disguise, folks! It provides a chance for TAPR to INNOVATE and get together a project like the TAPR TNC was! I think a TAPR STA-1 SS radio should be the first order of business -- don't you?

My little company RF/SS has a number of SS designs that can easily be adapted to Ham SS needs. I have even discussed this subject with Dwayne Hewndricks and am waiting on a response. We are very willing to "share" one or more of these designs with the Amateur Radio community for the worthy purposes TAPR has in mind. Please let me know what you think and what Ham SS needs!

BTW: Please visit our WEB Site at <http://sss-mag.com>, new and interesting SS stuff is posted there on a regular basis. In particular please see:
<http://sss-mag.com/whatsnew/nuindex.html#3>
-- you might get a few new ideas!

Best Regards,

Randy Roberts, KC6YJY

173. Re: [SS:STA:288] Re: The point of the SS group buy

From: Jeff King <jeff@mich.com>
Date: Thu, 30 Jan 1997 11:40:05 -0500
To: ss-sta@tapr.org, ss@tapr.org
Message-ID: <2.2.32.19970130164005.00733794@mail.mich.com>
Rendered body type: text/plain

At 11:31 PM 1/29/97 -0600, Steve Stroh wrote:

>
>On Wed, 29 Jan 1997, Jeff King wrote:
>
>> My point here is if indeed it is TAPR's goal to develop its own
>> SS technology, I can see the same thing happening again. More
>> importantly, since it is TAPR's position that it is a volunteer
>> organization, it would be best to train the membership to understand
>> SS concepts and hardware. It seems to me the best way to do this
>> is to work with open systems... either one of the Eval boards from
>> Harris (PRISM) or other companies or a more open system like
>> the ATT/Lucent WaveLan boards (which, BTW, has LINUX drivers).
>
..
I'm not speaking in an official capacity for TAPR.
..
>
>The eval kits sound very interesting, and if a group purchase could be
>arranged, it sounds like a good fit with TAPR's current sales of GPS and
>DSP units. TAPR >IS< its volunteers... are you volunteering to start
>evaluating SS eval kits, Jeff?
>
>Steve N8GNJ
>

Some in the membership already have. And I am more than willing. But we really need some comment from the TAPR leadership if this is a acceptable option.

-Jeff wb8wka

174. Re: [SS:936] Re: The point of the SS group buy

From: Jeff King <jeff@mich.com>
Date: Thu, 30 Jan 1997 12:02:51 -0500
To: ss@tapr.org, ss-sig@tapr.org
Message-ID: <2.2.32.19970130170251.0073b5e0@mail.mich.com>
Rendered body type: text/plain

At 07:08 AM 1/30/97 -0600, Tony Lanier wrote:

>
>While pursuing the eval kit direction would be a good learning experience,
it really will not establish Amateurs on the "cutting edge" of SS
technology. I feel a better route would be to develop a SS radio that is
easy to build (no harder than the TAPR DSP-93 kit), but one that allows
enough hooks in it to let the more experienced ham expand on the original
design. This way we will be able to ask the "What If" and "Why" questions
directly to those involved in the kit.
>
>The Harris PRISM chipset is a good idea, but again we would be designing
from a systems point-of-view. I feel more amateurs would understand the
complexities of SS better if the radio is built in a modular fashion and
explain WHY we are designing it this way as opposed to that way.
>
>Once we come up with a basic block diagram, the pieces should fall
(relatively) easy into place.
>
>73s de Tony KE4ATO
>
>

Tony:

I can't say I disagree with you, but the point of my post was to suggest
a eval unit as opposed to a pre-built (Proxium / Wireless Data) unit. Based
on your logic, I would think given a choice you'd prefer the eval unit over
the proprietary pre-built unit.

You aren't locked into a path with all eval units. My thoughts with a eval
unit is it would:

1. Get RF on the air in short order
2. Allow enough flexiability to develop our own kits/methods as you suggest.

I really think with the proper eval unit most of your concerns could be
addressed.

73

-Jeff wb8wka

175. Re: [SS-STA:289] Re: The point of the SS group buy

From: Jeff King <jeff@mich.com>
Date: Thu, 30 Jan 1997 12:47:24 -0500
To: ss@tapr.org, ss-sta@tapr.org
Message-ID: <2.2.32.19970130174724.007294f0@mail.mich.com>
Rendered body type: text/plain

Hi Don:

At 08:17 AM 1/30/97 -0600, wb9mjin@wb9mjin.ampr.org wrote:

>
> Hi,
>
> I m not in favor of TAPR developing a DSSS system for the STA. Our goal
>in the STA is to prove the compatibility of SS with rest of Ham Radio. And,
>I think the first frontier in this matter is the lower speed FH systems on
>lower frequencies. 440 or 915 being the most likely candidates.
>
> Right now, from what we have seen from Freewave, I think TAPR as a group
>can really outdo that product. Come up with true FH, that hops in microseconds,
>not msec, and has bitwise FEC. Spread across 420 to 450, the process gain
>would be such that we would have our best chance at being un-noticed, in a
>populated band. Of course 432 to 432.2 and 435 to 438 could be avoided by
>hop programming. I don t see an antenna issue either. While I don t have a
>product on the shelf that will do this, I don t see it as impossible. Right
>now, only a LPDA can provide a good antenna across this BW, with a little
>gain, and be purchased off the shelf.
>

Check out the Zilog Z87001 Spread-Spectrum controller. It is a cordless phone spread spectrum chip that has Adaptive Frequency Hopping and Transmit power control. Look at:

<http://www.zilog.com/wireless/wireless.html>

>
> With time, better DSSS chip sets might become available. 18 dB process
>gain is the limit now. The Zilog/Stanford Research STEL2000A has this as
>a maximum process gain. The Prism chip set maxes out at 11 dB. It is this
>limitation which really calls out for the need for directive antennas. And
>in the general deployment scenario, these would need to be azimuthal scanning
>antennas. That is, directive antennas.
>
>
>73, Don.

The AMI SX043 has a maximum process gain of 2048 chips/bit. Not sure if my calculation is right, but I *think* this would put it in excess of 33db process gain...

Check out:

<http://www.amis.com/wireless.html>

You can get eval units for both of these I believe

73

-Jeff wb8wka

176. What have been done sofar?! - Experiments.

From: "Marcel Bos" <mackel@hotmail.com>
Date: Thu, 30 Jan 1997 10:22:58 -0800 (PST)
To: ss@tapr.org
Message-ID: <199701301822.KAA18218@f21.hotmail.com>
Rendered body type: text/plain

Is there anyone here who like to contribute with her or his
SS work? - I like to make a transceiver for SS for shortwave
and for 144 Mhz... Please someone?

Get Your *Web-Based* Free Email at <http://www.hotmail.com>

177. Re: [SS:940] Re: The point of the SS group buy

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Thu, 30 Jan 1997 14:16:59 -0500
To: ss@tapr.org
Message-ID: <199701301916.OAA11668@Paris.GASD102designcenter>
Rendered body type: text/plain

> From ss@tapr.org Thu Jan 30 13:03:06 1997
> Date: Thu, 30 Jan 1997 11:03:49 -0600 (CST)
> Originator: ss@tapr.org
> From: Jeff King <jeff@mich.com>
> To: ss@tapr.org
> Subject: [SS:940] Re: The point of the SS group buy
> X-Listprocessor-Version: 6.0 -- ListProcessor by Anastasios Kotsikonas
> X-Comment: Tucson Amateur Packet Radio Spread Spectrum
>
> At 07:08 AM 1/30/97 -0600, Tony Lanier wrote:
>
> >
> >While pursuing the eval kit direction would be a good learning experience,
> it really will not establish Amateurs on the "cutting edge" of SS
> technology. I feel a better route would be to develop a SS radio that is
> easy to build (no harder than the TAPR DSP-93 kit), but one that allows
> enough hooks in it to let the more experienced ham expand on the original
> design. This way we will be able to ask the "What If" and "Why" questions
> directly to those involved in the kit.
> >
> >The Harris PRISM chipset is a good idea, but again we would be designing

> from a systems point-of-view. I feel more amateurs would understand the
 > complexities of SS better if the radio is built in a modular fashion and
 > explain WHY we are designing it this way as opposed to that way.
 > >
 > >Once we come up with a basic block diagram, the pieces should fall
 > (relatively) easy into place.
 > >
 > >73s de Tony KE4ATO
 > >
 > >
 > >
 > Tony:
 > >
 > I can't say I disagree with you, but the point of my post was to suggest
 > a eval unit as opposed to a pre-built (Proxium / Wireless Data) unit. Based
 > on your logic, I would think given a choice you'd prefer the eval unit over
 > the proprietary pre-built unit.
 > >
 > You aren't locked into a path with all eval units. My thoughts with a eval
 > unit is it would:
 > >
 > 1. Get RF on the air in short order
 > 2. Allow enough flexiability to develop our own kits/methods as you suggest.
 > >
 > I really think with the proper eval unit most of your concerns could be
 > addressed.
 > >
 > 73
 > >
 > -Jeff wb8wka
 > >
 > >

178. Re: [SS:940] Re: The point of the SS group buy

From: rlanier@su102s.ess.harris.com (Tony Lanier)
 Date: Thu, 30 Jan 1997 14:25:15 -0500
 To: ss@tapr.org
 Message-ID: <199701301925.OAA11670@Paris.GASD102designcenter>
 Rendered body type: text/plain

> Tony:
 > >
 > I can't say I disagree with you, but the point of my post was to suggest
 > a eval unit as opposed to a pre-built (Proxium / Wireless Data) unit. Based
 > on your logic, I would think given a choice you'd prefer the eval unit over
 > the proprietary pre-built unit.
 > >
 > You aren't locked into a path with all eval units. My thoughts with a eval
 > unit is it would:
 > >
 > 1. Get RF on the air in short order
 > 2. Allow enough flexiability to develop our own kits/methods as you suggest.
 > >
 > I really think with the proper eval unit most of your concerns could be
 > addressed.
 > >
 > 73
 > >
 > -Jeff wb8wka
 > >
 > >

Jeff,

The eval method or perhaps using a chipset such as PRISM would be a good
 method to get on the air as soon as possible. It might even give us an
 idea as to the best approach for a kit. However, I still contend that
 building a radio in a modular form, using a top-down design method is the
 best avenue to travel, whether we do this as a group or individually.

73s de Tony KE4ATO

179. Re: [SS:944] Re: The point of the SS group buy

From: "Fred M. Spinner" <fred@tekdata.com>
 Date: Thu, 30 Jan 1997 15:24:45 -0600 (CST)
 To: ss@tapr.org
 Message-ID: <Pine.BSF.3.91.970130152043.823B-100000@tekdata.com>
 Rendered body type: text/plain

On Thu, 30 Jan 1997, Tony Lanier wrote:
>
> Jeff,
>
> The eval method or perhaps using a chipset such as PRISM would be a good
> method to get on the air as soon as possible. It might even give us an
> idea as to the best approach for a kit. However, I still contend that
> building a radio in a modular form, using a top-down design method is the
> best avenue to travel, whether we do this as a group or individually.
>
> 73s de Tony KE4AT0
>
Academically, using a "modular" design would be a better learning experience,
but doesn't it make sense to use something simpler to make it actually
buildable?

I know it's desirable for us to "advance technology" rather than use it,
however would we "lose the forest for the tree" here? I mean maybe on the
original TNC it would have been higher tech if a ham designed modem was
used instead of a Bell 202, but as you can tell... if it isn't broken,
don't fix it?

>
>
Fred M. Spinner, KA9VAW
fred@tekdata.com

180. Re: The point of the SS group buy

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Fri, 31 Jan 1997 08:18:25 -0500
To: ss@tapr.org
Message-ID: <199701311318.IAA12443@Paris.GASD102designcenter>
Rendered body type: text/plain

> Academically, using a "modular" design would be a better learning experience,
> but doesn't it make sense to use something simpler to make it actually
> buildable?

What I mean by modular is develop system using "blocks" and connect them together.
Each block would perform a particular function, such as a PN generator, baseband
processor, etc. If we build the SS radio this way, at least in my opinion, hams
can understand the complexities of the radio better than if we used a chipset. I
feel that learning how everything works is a better learning experience.

Or maybe I am asking too much?

> I know it's desirable for us to "advance technology" rather than use it,
> however would we "lose the forest for the tree" here? I mean maybe on the
> original TNC it would have been higher tech if a ham designed modem was
> used instead of a Bell 202, but as you can tell... if it isn't broken,
> don't fix it?

Well, I suppose that depends on how much work you want to put into the thing. If
we just do a minimal radio, then we will end up like packet radio at 1200 bps.
Personally, I think that doing packet radio at 1200 bps is a joke. I know some
hams have pushed this limit and that is how I would like to see SS pushed. Not
just any old radio, but one that you can step back from and say, "Man, now THAT
is cool!"

I suppose one way to make everyone happy is to develop a "basic" radio, probably
from a chipset, such as PRISM or the Zilog chips. Once that is working, move on
to a more advanced design, such as what I discussed.

What do you guys think?

73s de Tony KE4AT0

181. Re: [SS:946] Zilog

From: Steve Sampson <ssampson@claven.tinker.af.mil>
Date: Fri, 31 Jan 1997 08:00:07 -0600
To: ss@tapr.org
Message-ID: <32F1FAE7.41C6@eds.tinker.af.mil>
Rendered body type: text/plain

Tony Lanier wrote:

>
> I suppose one way to make everyone happy is to develop a "basic" radio, probably
> from a chipset, such as PRISM or the Zilog chips.

Probably won't be Zilog. I've tried several times last year to get docs from them. They never did respond.

182. Re: [SS:947] Re: Zilog

From: wb9mjn@wb9mjn.ampr.org
Date: Fri, 31 Jan 97 08:07:56 UTC
To: ss@tapr.org
Message-ID: <12599@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Steve,

In my endeavours, I found Zilog one of the easiest to get docs from. They have everything on their web site, in acrobat files. And acrobat files produce the best printed result, without randomised page separations, that cut info in half. The Acrobat files, are the same, i presume, as the pre-printer data book files. The quality is certainly as professional as a data book, or printed up data sheet. I m printing the 87001 data sheet as I type this and its 50 pages long. Just like one would expect in a real live data book.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

183. Re: [SS:946] Re: The point of the SS group buy

From: Gordon_Dey@Software.Mitel.COM (Gordon Dey)
Date: Fri, 31 Jan 97 09:36:34 EST
To: ss@tapr.org
Message-ID: <9701311436.AA04089@Software.Mitel.COM>
Rendered body type: text/plain

Tony asked:
> What do you guys think?

Here's my 0.75 cents US.

Personally, I don't have the skill to design the SS RF front end (although I'd love to acquire those skills :-()) Nor do I have access to the type of equipment needed to debug a new design. But I can help with firm/software, and I'm dangerous with digital logic.

But most of all, I like ham radio for the hands-on.

>From those two perspectives, I'd welcome a PRISM-type front end that can get me started playing with the stuff I *CAN* play with. I'm reminded of the Bard's warning:

"...smothered in surmise."

I think that if you put out an analogy to the TNC-1 (simple, hack-able, starting point, and start putting it in folks hands) it will start an avalance of development that'll last a decade. And I perceive the conditions are ripe for an avalance. So if we can't design a front-end within the next, say two months, lets start a parallel development process by dropping in a chipset. I'm not proud.

73, Gord.

184. Re: [SS:948] Re: Zilog

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Fri, 31 Jan 1997 10:59:44 -0500
To: ss@tapr.org
Message-ID: <199701311559.KAA12719@Paris.GASD102designcenter>
Rendered body type: text/plain

> printed up data sheet. I m printing the 87001 data sheet as I type this and
> its 50 pages long. Just like one would expect in a real live data book.

> 73, Don.

How do you intend to use the Zilog part?

Just curious.

73s de Tony KE4AT0

185. Re: [SS:948] Re: Zilog

From: David G Taylor <taylord@ecn.purdue.edu>
Date: Fri, 31 Jan 1997 11:10:29 -0500 (EST)
To: ss@tapr.org
Message-ID: <v03007800af1782a55427@[128.46.169.162]>
Rendered body type: text/plain

> Hi Steve,
>
> In my endeavours, I found Zilog one of the easiest to get docs from. They
> have
> everything on their web site, in acrobat files.

Ditto for me. I haven't ask for a sample chip yet, but I like Zilog products. The things one can do with the Z80 chip and peripherals family !

73 de David KB9KNS (Am cordless; will travel.)
--taylord@ecn.purdue.edu

186. Re: [SS:950] Re: Zilog

From: wb9mjn@wb9mjn.ampr.org
Date: Fri, 31 Jan 97 11:28:02 UTC
To: ss@tapr.org
Message-ID: <12605@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Tony,

I really don't know yet. Its a new chip that I didn't know about. Its a TDD FHSS chip.

In the past i've proposed 6 meter TDD networking, primarily for voice. I guess that would be one way, hi.

The SX043 chip is looking pretty amazing, too. Its DSSS tho, but with 33 dB max processing gain, and 64 Mchip/s maximum rate.

So, I'm confused again, hi. For medium speed application, one can get similar processing gains with FH or DSSS. FH has less impact on FM Voice users, but would clobber .5GFSK packet users. DSSS would have almost no effect on .5 GFSK users, but sooner or later its going to cause all sorts of troubles for satellite or weak sig guys in the near vicinity of a DSSS station. FH would have a little impact on weak signal reception, but because the pulse is only once in a while, it would not shut them down. Let me restate, FH will have almost no noticable effect on FM Voice, if its fast enuf.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

187. Re: [SS:949] Re: The point of the SS group buy

From: Jerry Normandin <jerryn@ici.net>
Date: Fri, 31 Jan 1997 12:46:17 -0500
To: ss@tapr.org
Message-ID: <32F22FE9.41C67EA6@ici.net>
Rendered body type: text/plain

I don't know why everyone is trying to design hardware and thinking of digipeating. Wireless Ethernet has no need to Digipeat in the way you are thinking. I use Wireless Ethernet Cards... like the NEC Wavelan. It's Spread Spectrum from 915-925Mhz. When A transmission is made in spread spectrum it's "OMNIPRESENT" in the band it's transmitting. It's everywhere at once. When you listen to Spread Spectrum Data you can only monitor a small piece of data... it sounds like a popping noises... anyway the data gets routed the same way it gets routed in an ethernet router, granted you need

router code running... packets get redirected in ns! No need for digipeating that technology is slow and antique! What we need is someone to bulk purchase wavlean cards for us. last time I bought my cards I paid \$500.00 a pop. It would be nice if someone bulk purchases for us at \$200.00 a pop. I can use 5 more.

188. Re: [SS:953] Re: The point of the SS group buy

From: Jeff King <jeff@mich.com>
Date: Fri, 31 Jan 1997 21:11:00 -0500
To: ss@tapr.org, ss-sta@tapr.org
Message-ID: <2.2.32.19970201021100.0071c19c@mail.mich.com>
Rendered body type: text/plain

At 12:00 PM 1/31/97 -0600, Jerry Normandin wrote:
>I don't know why everyone is trying to design hardware and thinking
>of digipeating. Wireless Ethernet has no need to Digipeat in the way
>you are thinking. I use Wireless Ethernet Cards... like the NEC
>Wavelan. It's Spread Spectrum from 915-925Mhz.
..
>What we need is
>someone to bulk purchase wavlean cards for us. last time I bought
>my cards I paid \$500.00 a pop. It would be nice if someone bulk
>purchases for us at \$200.00 a pop. I can use 5 more.
>
>

Jerry:

Not sure who "everyone" is, but if you'll re-read my original post, you'll see I mentioned the WaveLan as a alternative to the present track. Of all the proprietary standards (FreeWave, Proxium, et all), they appear on face to be the most open. And they have Linux drivers as you have pointed out to this group in the past.

As to "digipeating", I think I missed that one. You have to remember this is a SS sig in the context (I think) of amateur radio. As such the users are not constrained by the limitations of Part 15, at least with regard to power and I'm sure many have seen the limitations of the present implementations of SS. Likely this is the interest in developing there own radio.

What I was proposing was a compromise between buying something off the shelf (proprietary) and rolling your own (long development cycle, not cost effective). I was suggesting we, under the aspics of a TAPR group purchase, try to locate some development kits using some of the existing manufacturers chip sets/modules. I've previously discussed this so I won't elaborate.

One question still remains unanswered..... is TAPR willing to per sue this? I'm willing to volunteer to help, and in fact already have a call into my local Zilog rep. Others have also expressed interest. Obviously, we can go this alone, but I think we could get better prices as a group and share our ideas. This has been proven with the Motorola DSP56 purchase. Anyone on the TAPR BOD care to give any direction at this point?

-Jeff wb8wka

189. Zilog/AMI

From: Jeff King <jeff@mich.com>
Date: Fri, 31 Jan 1997 21:22:35 -0500
To: ss-sta@tapr.org, ss@tapr.org
Message-ID: <2.2.32.19970201022235.006bef04@mail.mich.com>
Rendered body type: text/plain

At 01:47 PM 1/30/97 -0600, wb9mjn@wb9mjn.ampr.org wrote:
>
> Hi Jeff,,
>
>
> Oops, the Zilog 87000 is a FH Cordless Phone chip. The 87001, is maybe
>an update on the 87000? Haven t gotten to that web site, yet.

I think its a ROMless version of the 87000... at least that's the impression I got.

> The AMI SX043 has a 64 Mchip/sec maximum rate, so, the maximum chip
>per bit is 64 Mchip/sec divided by Data rate , or 2047, whichever is less. So,
>a 2 Mbps data rate has a maximum processing gain of 18 dB, and only data
>rates less than 31 kbaud can have the 33 dB processing gain. The SX043 is
>a tau-dither lockup. So, its not appropriate for DDMAWAN, which is best with
>a correlator matched filter (locks up in one symbol time).
>
>
>
>73, Don.
>

Yeap. I knew it couldn't do 2megabits at a chip rate of 2047 but was responding
to your post that the best you had seen of the chip sets was 18db process gain.
31kbits/second should be able to handle a voice channel.... would make for
a interesting HT :-)

On another one of your posts you indicated FH would have less impact on
a voice repeater then DS. Is this a user model or a engineering model?
I'd think DS would exist better with FM voice, from the perspective of
the voice users not knowing it was there, then FH.... assuming the energy
level of the DS is below the FM carrier. The FH might cause popping on
the user receiver were as the DS would just raise the noise floor. As
most 'users' wouldn't hear the DS, they wouldn't/couldn't object to it.

-Jeff

February 1997

Original source file: ss.9702

Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9702

1. RE: The point of the SS group buy(Tony Lanier)

From: kc5goi@kc5goi.ampr.org (guy j story)
Date: Sat, 01 Feb 97 12:40:17 cst
To: ss@tapr.org
Message-ID: <223@kc5goi.ampr.org>
Rendered body type: text/plain

In reference to Tony's post, I have to agree. I have been thinking about the purchase of a 9600 baud tnc lately but decided not to in favor of the SS project. 1200 baud is a joke but 9600 is not much better. Newer ways of sending data, voice and so on are needed. I was looking forward to the FW radio and was disappointed in the project falling out. I am in favor of a kit that a person would build due to the learning aspect and the pride of saying I built it. I am one of the hams that does not have a great deal of technical background or financial resources. Because of this I feel that this makes me a good test bed as the "average joe ham". If I can make it work so can anyone else. The brick wall people run up against is that this is new and I don't understand. There for some will not even consider it. That is why some people still embrace tube gear as "Gods gift to the hobby". A kit will give hands on experience. The FW radio was a quick way to get up and running. We need to get the show on the road before the STA expires. That is one of the impressions I got for using the FW. That still is an avenue we need to pursue. But we also need to consider long term goals.

```
=====
= 73, KC5G0I =
= Denton, Tx USA =
= email:kc5goi@kc5goi.ampr.org =
=====
```

2. What next? (was Re: Point(Tony Lanier))

From: Jeff King <jeff@mich.com>
Date: Sat, 01 Feb 1997 17:02:06 -0500
To: ss@tapr.org, ss-sta@tapr.org
Cc: kc5goi@kc5goi.ampr.org
Message-ID: <2.2.32.19970201220206.006be430@mail.mich.com>
Rendered body type: text/plain

At 12:45 PM 2/1/97 -0600, guy j story wrote:

>I was looking forward to the FW radio
>and was disappointed in the project falling out. I am in favor of a kit that
>a person would build due to the learning aspect and the pride of saying I
>built it.

A Eval board is basically a kit. Sorta of akin to a TAPR Alpha/Beta board TNC. It would create a new wave of innovation within the amateur community. BTW, Randy Roberts has also offered a "ham hopper" design to the amateur community... but not sure if it is operational yet.

>The FW radio was a quick way to get up and running.
>We need to get the show on the road before the STA expires. That is one
>of the impressions I got for using the FW. That still is an avenue we
>need to pursue. But we also need to consider long term goals.

>
>
>
>=====

>= 73, KC5G0I =

But the FreeWave was a decent radio... I'm not so sure what I am hearing being discussed will even hold a candle to the FreeWave. For example, both radios mentioned are 2.4ghz units... most hams were going to be frequency challenged at 900mhz let alone at 2.5ghz. I'm not saying I'm against 2.5ghz development, I just want folks to be aware we are talking two different animals. Also, both 2.5ghz radios mentioned are 100mw units, that and the reduction in sensitivity on both 2.5ghz units give the FreeWave a 30db advantage. Also add in the fact it was a lower cost radio and you come up with the same answer I did.... maybe we need to think about what direction we are going before we leap.

However, my primary concern is having a development path that a proprietary solution wouldn't give us.

-Jeff

3. Any TAPR Group Purchase

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Sat, 1 Feb 1997 16:13:55 -0600
To: " Spread Spectrum "<ss@tapr.org>
Message-ID: <v03020701af1960a81628@[208.134.134.40]>
Rendered body type: text/plain

There has been some discussion on the list about how TAPR does group purchases.

Let me outline the unofficial policy.

Basically, if someone can show something that is of interest to a critical mass of people such that it helps the membership of TAPR for TAPR to handle the ordering then the project will be considered by TAPR to be done.

Examples have been the PC-DSP purchase just completed, the EVM56002 DSP units (which Dorothy is shipping the last of) and the Garmin GPS-20s.

The issue that gets most potential purchases is that the markup of TAPR's overhead (Visa expense, shipping, office time, general overhead) has to be factored into the price of which the item can be handled by TAPR and provided to people for purchase. Many times, potential group deals do not gell, because the final price with overhead is not a significant enough savings for a group purchase to happen.

We would be willing to entertain any of the notions or projects people have in mind, but has any of you looked at the pricing of the eval units that the mfg are offering. I know the Harris set costs around \$3000+ to get all the various elements to make a working system. The loral SS eval board (which has no RF) costs about \$2500 to get. I think we will find that any of these approaches will be cost limited.

If someone has a concept for a project, we are all ears. We have already had two projects discussed very informally for TAPR to do. Both have been very speculative in nature and we are waiting to see if either will have anything done beyond just some basic thoughts.

Talking about doing something is one thing, but doing it and following through the entire process is more than many realize the level of commitment.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

4. Re: [SS:931] Re: WaveLAN Performance (Was: *nix on floppy)

From: Clearbrook Technical <clearbrook_technical@mindlink.bc.ca>
Date: Sat, 1 Feb 1997 18:16:17 -0800
To: ss@tapr.org
Message-ID: <199702020216.SAA13911@linux.clrtech.com.>
Rendered body type: text/plain

>> Within my house I consistently get 190 kbyte/second ftp transfer speeds
>> when transferring large files and there are only two stations active.
>

>That's impressive. I tried the WaveLAN packet driver and JNOS, and
>only got about 70 kbytes/s. This was with the TCP window equal to
>the MSS - if I opened up the window to a multiple of MSS, the
>throughput nosedived to near-zero. I got the impression that JNOS
>wasn't keeping the pipe filled, so carrier would drop briefly
>between outgoing segments, causing the receiving end to ACK and
>collide with the next segment. Or maybe WaveLAN is doing something
>strange at the link layer which interacts badly with the upper layers,
>or maybe the packet driver is just plain broken. Anybody got a handle
>on that?

>
>Barry
>

I had similiar experience with my jnos configuration, I had to keep the tcp win

to a maximum of double the MSS, any higher than that, and the thruput would suffer greatly. When i switched to linux I was impressed with the improvement I run the TCP Window open (linux default) and thruput regularly is around 1.5Mbits showing on the IPswitch FTP client (on Win 95 PC). The link always feels much 'smoother' using the linux configuration over the jnos.....

>

Fred Kehler (ve7ipb)
Clearbrook Technical Services Ltd

5. Re: [SS:958] Any TAPR Group Purchase

From: Randy Roberts <randyrf@sss-mag.com>
Date: Sat, 1 Feb 97 17:31 PST
To: ss@tapr.org
Message-ID: <2.2.16.19970202093039.517fbce2@sss-mag.com>
Rendered body type: text/plain

OK folks, here goes -- ACTION, not talk!

KC6YJY's Proposed SST-1 SS Radio-Modem for Ham Radio Applications

Here's my proposal:

I (and RF/SS) will grant a THREE YEAR NON-EXCLUSIVE LICENSE to TAPR [or any other Bona Fide Amateur Radio Organization], at NO COST WHATSOEVER, which includes a relatively complete design and documentation package for a "Universal," DSSS / FHSS / Hybrid FH-DS radio-modem with the following initial design characteristics and specifications preliminarily outlined below).

This licensed design package will allow the user to rapidly assemble the pieces needed to offer either kits or completed products to the Amateur Radio Community. These kits can be modular in capability and can be designed with expansion in mind. The performance of this licensed design is State of the Art in every way. It uses the latest in ASIC technology and provides better than commercial WLAN SS communications, that rival what the US military are using today!

PROVIDED:

(1) The radio-modem is used ONLY for Amateur / non-commercial or to-be-negotiated educational uses.

(2) TAPR (or any other Bona Fide Amateur Radio Organization) and other assorted / interested volunteers supply labor and materials, as needed, to fully develop and test this new design.

(3) TAPR (or any other Bona Fide Amateur Radio Organization) sets up a Project / Team organization to provide direction, guidance and start on a "Ham Radio SS" Standard, ASAP!

(4) The draft standard mentioned in (3) above is ready for circulation and comment by 1 May, 1997 AND that the Final Interim Standard for Ham SS operations is released by 1 August, 1997.

PROPOSED RF/SS SST-1 RADIO-MODEM SPECIFICATIONS:

- Half duplex on the air communications
- TX - RX & RX - TX Switching Times: 500 microseconds, design goal
- Frequency Range: 24 to 34 MHz (TO BE USED with an OUTBOARD LINEAR TRANSVERTER for operating frequency band.)
- TX output Power: > +13 dBm (20mw) average
- RX NF: < 3 dB
- SS Mode Capability: DSSS, FHSS, Hybrid FH-SS
- Process Gain: 10 to 18 dB with DSSS / up to 30 dB with FHSS / > 40 dB with Hybrid FH-SS
- DSSS Chipset: STEL-2000A (same as Zilog Z87200)
- FHSS Chip set: Analog Devices AD9955 (Fast option) / AD7008

(Slow option)

- "SMART" Radio Setup & Control: PIC 16C64A
- HOST I/O: slow speed = RS-232 / high speed = Synchronous Serial (SIO) port (HDLC-like) -- both I/O speeds use Tx / RX handshaking
- Data Rates: 1 bps to >250 kbps
- Master Clock: 80 MHz TCXO, freq. stability , +/- 10 ppm
- Frequency Hopping Speed: 1 microsecond maximum, design goal
- PN Codes: Fully Programmable in length and selection
- FH Codes: Fully Programmable in length and selection
- Multiple Access Capability: Fully Programmable / User selectable
- Baseband Data Protocols: TBD / TBS
- HOST / TNC Characteristics: To Be Developed
- OSI Communication Modes / Level Definition: To Be Developed
- Applications / Application Software: To Be Developed
- Physical: Two PCBs - each about 3" x 5" (Two sided), design goal (See Baseband PCB Breadboard at top of page)
- POWER Required: + 11 to 14 VDC at less than 1 amp
- Other Characteristics: TBD / TBS

PLEASE take a look at actual test results and breadboard pictures at my home page:

<http://sss-mag.com/hamnotes.html>

Hope TAPR or some of you out there are interested.

TNX & 73

de Randy Roberts, KC6YJY

At 04:14 PM 2/1/97 -0600, you wrote:

>There has been some discussion on the list about how TAPR does group purchases.

>

>Let me outline the unofficial policy.

>

>Basically, if someone can show something that is of interest to a critical mass of people such that it helps the membership of TAPR for TAPR to handle the ordering then the project will be considered by TAPR to be done.

>

>Examples have been the PC-DSP purchase just completed, the EVM56002 DSP units (which Dorothy is shipping the last of) and the Garmin GPS-20s.

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>The issue that gets most potential purchases is that the markup of TAPR's overhead (Visa expense, shipping, office time, general overhead) has to be factored into the price of which the item can be handled by TAPR and provided to people for purchase. Many times, potential group deals do not gell, because the final price with overhead is not a significant enough savings for a group purchase to happen.

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>If someone has a concept for a project, we are all ears. We have already had two projects discussed very informally for TAPR to do. Both have been very speculative in nature and we are waiting to see if either will have anything done beyond just some basic thoughts.

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>Talking about doing something is one thing, but doing it and following
>through the entire process is more than many realize the level of
>commitment.
>
>Cheers - Greg
>
>-----
>Greg Jones, WD5IVD
>Austin, Texas
>wd5ivd@tapr.org
>http://www.tapr.org/~wd5ivd
>-----

6. Re: [SS:959] Re: WaveLAN Performance (Was: *nix on floppy)

From: Jerry Normandin <jerryn@ici.net>
Date: Sat, 01 Feb 1997 22:13:04 -0500
To: ss@tapr.org
Message-ID: <32F40640.26E6236E@ici.net>
Rendered body type: text/plain

Clearbrook Technical wrote:

>
> >> Within my house I consistently get 190 kbyte/second ftp transfer speeds
> >> when transferring large files and there are only two stations active.
> >
> >That's impressive. I tried the WaveLAN packet driver and JNOS, and
> >only got about 70 kbytes/s. This was with the TCP window equal to
Gee Guys,

This is what I have been claiming all along and NOT MANY BELIEVED
ME!!

LINUX is the way to go, and it's very effecient as a wireless router!
NO MORE DIGIPEATING IT IS NOT NECCESARY!!!!!!!!!!!!!!!!!!!! THIS WILL
BEHAVE THE SAME WAY AS AN ETHERNET ROUTER!!!!!!!!!!!!!!!!!!!!

> >the MSS - if I opened up the window to a multiple of MSS, the
> >throughput nosedived to near-zero. I got the impression that JNOS
> >wasn't keeping the pipe filled, so carrier would drop briefly
> >between outgoing segments, causing the receiving end to ACK and
> >collide with the next segment. Or maybe WaveLAN is doing something
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> >or maybe the packet driver is just plain broken. Anybody got a handle
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> suffer greatly. When i switched to linux I was impressed with the improvement
> I run the TCP Window open (linux default) and thruput regularly is around
> 1.5Mbits showing on the IPswitch FTP client (on Win 95 PC). The link always
> feels much 'smoother' using the linux configuration over the jnos....
>
> >
>
> Fred Kehler (ve7ipb)
> Clearbrook Technical Services Ltd

7. Re: [SS:960] Re: Any TAPR Group Purchase

From: arutz@shfmicro.com (alan rutz)
Date: Sat, 1 Feb 1997 21:28:35 -0600
To: ss@tapr.org
Message-ID: <199702020328.VAA10740@alice.adsnet.com>
Rendered body type: text/plain

As a charter subscriber to Randy's Spread-spectrum magazine back in 1991-92,
I have always thought his designs, writing, and news on the RF designs for
ss have been ahead of anything else I could find. I certainly think the
offer he has made deserves attention. If his offer follows plans printed
early-on in his publications, it is probably easy to understand and to
build. de alan, wa9gka

8. Re: [SS:960] Re: Any TAPR Group Purchase

From: Jerry Normandin <jerryn@ici.net>
Date: Sat, 01 Feb 1997 22:21:58 -0500
To: ss@tapr.org
Message-ID: <32F40856.AEB2048@ici.net>
Rendered body type: text/plain

Randy Roberts wrote:

>
> OK folks, here goes -- ACTION, not talk!
>
> KC6YJY's Proposed SST-1 SS Radio-Modem for
> Ham Radio Applications
>
> Here's my proposal:
>
> I (and RF/SS) will grant a THREE YEAR NON-EXCLUSIVE LICENSE
> to TAPR [or any other Bona Fide Amateur Radio Organization], at
> NO COST WHATSOEVER, which includes a relatively complete
> design and documentation package for a "Universal," DSSS / FHSS
> / Hybrid FH-DS radio-modem with the following initial design
> characteristics and specifications preliminarily outlined below).
>
> This licensed design package will allow the user to rapidly assemble
> the pieces needed to offer either kits or completed products to the
> Amateur Radio Community. These kits can be modular in capability
> and can be designed with expansion in mind. The performance of this
> licensed design is State of the Art in every way. It uses the latest in
> ASIC technology and provides better than commercial WLAN SS
> communications, that rival what the US military are using today!
>
> PROVIDED:
>
> (1) The radio-modem is used ONLY for Amateur / non-commercial or
> to-be-negotiated educational uses.
>
> (2) TAPR (or any other Bona Fide Amateur Radio Organization) and
> other assorted / interested volunteers supply labor and materials,
> as needed, to fully develop and test this new design.
>
> (3) TAPR (or any other Bona Fide Amateur Radio Organization) sets
> up a Project / Team organization to provide direction, guidance and
> start on a "Ham Radio SS" Standard, ASAP!
>
> (4) The draft standard mentioned in (3) above is ready for circulation
> and comment by 1 May, 1997 AND that the Final Interim Standard
> for Ham SS operations is released by 1 August, 1997.
>
> PROPOSED RF/SS SST-1 RADIO-MODEM SPECIFICATIONS:
>
> - Half duplex on the air communications
>
> - TX - RX & RX - TX Switching Times: 500 microseconds, design goal
>
> - Frequency Range: 24 to 34 MHz (TO BE USED with an OUTBOARD
> LINEAR TRANSVERTER for operating frequency band.)
>
> - TX output Power: > +13 dBm (20mw) average
>
> - RX NF: < 3 dB
>
> - SS Mode Capability: DSSS, FHSS, Hybrid FH-SS
>
> - Process Gain: 10 to 18 dB with DSSS / up to 30 dB with FHSS / >
> 40 dB with Hybrid FH-SS
>
> - DSSS Chipset: STEL-2000A (same as Zilog Z87200)
>
> - FHSS Chip set: Analog Devices AD9955 (Fast option) / AD7008
> (Slow option)
>
> - "SMART" Radio Setup & Control: PIC 16C64A
>
> - HOST I/O: slow speed = RS-232 / high speed = Synchronous Serial
> (SIO) port (HDLC-like) -- both I/O speeds use Tx / RX handshaking
>
> - Data Rates: 1 bps to >250 kbps
>
> - Master Clock: 80 MHz TCXO, freq. stability , +/- 10 ppm
>
> - Frequency Hopping Speed: 1 microsecond maximum, design goal

```

>
>   - PN Codes: Fully Programmable in length and selection
>
>   - FH Codes: Fully Programmable in length and selection
>
>   - Multiple Access Capability: Fully Programmable / User selectable
>
>   - Baseband Data Protocols: TBD / TBS
>
>   - HOST / TNC Characteristics: To Be Developed
>
>   - OSI Communication Modes / Level Definition: To Be Developed
>
>   - Applications / Application Software: To Be Developed
>
>   - Physical: Two PCBs - each about 3" x 5" (TWO sided), design goal
>     (See Baseband PCB Breadboard at top of page)
>
>   - POWER Required: + 11 to 14 VDC at less than 1 amp
>
>   - Other Characteristics: TBD / TBS
>
> PLEASE take a look at actual test results and breadboard pictures at my home
> page:
>
>           http://sss-mag.com/hamnotes.html
>
> Hope TAPR or some of you out there are interested.
>
> TNX & 73
>
> de Randy Roberts, KC6YJY
>
> -----
>
> At 04:14 PM 2/1/97 -0600, you wrote:
> >There has been some discussion on the list about how TAPR does group purchases.
> >
> >Let me outline the unofficial policy.
> >
> >>Basically, if someone can show something that is of interest to a critical
> >mass of people such that it helps the membership of TAPR for TAPR to handle
> >the ordering then the project will be considered by TAPR to be done.
> >
> >>Examples have been the PC-DSP purchase just completed, the EVM56002 DSP
> >units (which Dorothy is shipping the last of) and the Garmin GPS-20s.
> >
> >>The issue that gets most potential purchases is that the markup of TAPR's
> >overhead (Visa expense, shipping, office time, general overhead) has to be
> >factored into the price of which the item can be handled by TAPR and
> >provided to people for purchase. Many times, potential group deals do not
> >gell, because the final price with overhead is not a significant enough
> >savings for a group purchase to happen.
> >
> >>We would be willing to entertain any of the notions or projects people have
> >in mind, but has any of you looked at the pricing of the eval units that
> GEE Why do this when you can get a ATT&T WaveLAN CLONE for UNDER
> $500.00, it does 2MBS (I see 1.8MBS average with ftp.)
> I have a 20db Billateral amp on this puppy. I'm still only
> averaging 1Watt.

```

The cool think about Spread Spectrum is that it's Omnipresent. Immune to noise but if your only pushing the 20mw that this guy is trying to sell you will be drowned in an ocean of noise floor when there is snow on the ground! I know because I was playing with these cards at 250mw with the winpy indoor antennea that they ship with the product. I was able to get 1800ft out of these puppies until there was snow on the ground. Neighboring microwave uplinks and cell phone pads reaked havock on me so I picked up a couple od colinear antenneas and a billateral amp for my main router. 10 Miles NO PROBLEM. I can get more milage from hopping from router to router. I am working on some code that will minimize collisions.

```

> >the mfg are offering. I know the Harris set costs around $3000+ to get all
> >the various elements to make a working system. The loral SS eval board
> >(which has no RF) costs about $2500 to get. I think we will find that any
> >of these approaches will be cost limited.

```

> >
> >If someone has a concept for a project, we are all ears. We have already
> >had two projects discussed very informally for TAPR to do. Both have been
> >very speculative in nature and we are waiting to see if either will have
> >anything done beyond just some basic thoughts.
> >
> >Talking about doing something is one thing, but doing it and following
> >through the entire process is more than many realize the level of
> >commitment.
> >
> >Cheers - Greg
> >
> >-----
> >Greg Jones, WD5IVD
> >Austin, Texas
> >wd5ivd@tapr.org
> ><http://www.tapr.org/~wd5ivd>
> >-----

9. Re: [SS:962] Re: Any TAPR Group Purchase

From: Clearbrook Technical <clearbrook_technical@mindlink.bc.ca>
Date: Sun, 2 Feb 1997 12:41:10 -0800
To: ss@tapr.org
Message-ID: <199702022041.MAA14470@linux.clrtech.com.>
Rendered body type: text/plain

At 09:32 PM 2/1/97 -0600, you wrote:

>As a charter subscriber to Randy's Spread-spectrum magazine back in 1991-92,
>I have always thought his designs, writing, and news on the RF designs for
>ss have been ahead of anything else I could find. I certainly think the
>offer he has made deserves attention. If his offer follows plans printed
>early-on in his publications, it is probably easy to understand and to
>build. de alan, wa9gka
>
>
>

I have visited this site from time to time as well and the modular approach
that Randy uses sure looks like a good educational opportunity for coming up
to speed on a new technology, i would be interested in something like this
as a TAPR group purchase...
my 2cents\$C

Fred Kehler (ve7ipb)
Clearbrook Technical Services Ltd

10. Re: [SS:963] Re: Any TAPR Group Purchase

From: "Gary L. Grebus" <glg@balrog.k8lt.ampr.org>
Date: Mon, 03 Feb 1997 01:00:16 -0500
To: ss@tapr.org
Message-ID: <m0vrHRw-0000GMC@k8lt.ampr.org>
Rendered body type: text/plain

> ...Immune
> to noise but if your only pushing the 20mw that this guy is trying to
> sell you will be drowned in an ocean of noise floor when there is
> snow on the ground!

Read the proposal more carefully. The device is intended for use with an external linear transverter
which will provide the desired power level at the desired frequency.

As you have pointed out over and over again, it is possible to build wireless data links using existing
software and commercial wireless networking gear.

But that is not the only goal. Some of us would like to understand the building blocks that go into
that commercial wireless networking gear so that we might apply the technology to amateur radio
applications. A Linux PC and a Wavelan card makes an excellent test bed, but it's probably not how you
want to implement a handheld SS voice radio.

73,

/gary

Gary L. Grebus Home: glg@k8lt.ampr.org
Brookline, NH Work: grebus@zk3.dec.com
 Ham Packet: K8LT@W10N.FN42JM.MA.USA.NOAM

11. RE: 930] Re: WaveLAN Performance (Was: *nix on floppy)

From: "Rochford, Richard E." <rero@cbmsmail.cb.lucent.com>
Date: 3 Feb 97 09:03:00 -0500
To: "ss" <ss@tapr.org>
Message-ID: <32F5F07C@cbmsmail.cb.lucent.com>
Rendered body type: text/plain

The MAC address must be different for every device manufactured.

From: ss[SMTP:tapr.org!ss@cbemg]
Sent: Tuesday, January 28, 1997 1:20 PM
To: ss
Subject: [SS:930] Re: WaveLAN Performance (Was: *nix on floppy)

Jerry Normandin Replies:

If anyone ever paid attention to my previous posts you'd notice that I had to modify the Linux driver for Wavelan because many of the new cards are manufactured by Lucent technologies and THEY changed the MAC address. The MAC address is checked upon driver initialization and if the MAC don't match the driver does not load. I rewrote my driver and it works fine!!!!!!!!!!!!!!

And to the turkey asking what Sr. stands for it's Senior

Bernie Doehner wrote:

>
> > Indeed, I think it's time to put this wayward thread to rest.
>
> Second that!
>
> > have been achieved? What about driver issues? I've heard reports
> > that the WaveLAN driver for Linux doesn't work with recent kernel
> > versions - any experience out there?
> >
>
> Can't comment about the Linux ISA driver. I can just say that the
> wavelan driver from pcmcia-cs-2.9.0 works really well with kernel
2.0.27.
>
> I am involved with a FreeBSD developer in Australia and a professor at
> Portland State University in testing/developing the FreeBSD 2.2
> driver for Wavelan. I am presently running this wavelan driver under
> 2.2-BETA without any problems except that you can't set the IRQ with
the
> kernel quite yet (a checksum calculation routine needs to be fixed).
>
> Within my house I consistently get 190 kbyte/second ftp transfer speeds
> when transferring large files and there are only two stations active.
>
> I haven't yet gotten to the point of trying out outdoor.
>
> Bernie

--
Jerry Normandin, iCi Sr. Systems Engineer
Tel.(508)261-0383 x1118
"I'm not only an iCi Staff member, I'm
also a client!"

12. New Radio Project

From: Don Hilman <hilman@camosun.bc.ca>
Date: Mon, 03 Feb 1997 22:21:21 -0800
To: ss@tapr.org
Message-ID: <32F6D561.7A4@camosun.bc.ca>
Rendered body type: text/plain

I would be willing to add our support here at Camosun (a technical college in Victoria) to do any testing and support work to develop what Randy has been describing.

We have access to several Linux servers in lab and Spectrum Analyzers etc on the RF end.

We are interested in building and testing any ss system as I will be

using it as a demo in my networking or datacom labs for courses I teach to Computer Science students.

The college is VE7CCD and I am VE7FBI.

13. Re: [SS:960] Re: Any TAPR Group Purchase

From: Jack Taylor <n7oo@goodnet.com>
Date: Mon, 3 Feb 1997 11:43:48 -0700 (MST)
To: ss@tapr.org
Message-ID: <Pine.GS0.3.95.970203105409.34B-100000@goodguy>
Rendered body type: text/plain

I want to thank Randy for posting his offer and for providing an EXCELLENT web site for SS! The info and various tutorials have been printed out and have filled a good-sized 3 ring binder. My initial thoughts on Randy's proposed project is that it's really not necessary to get too basic as the tutorials do give adequate info on SS techniques.

What we really need is an easily assembled configuration that can be quickly produced and put into service. I for one, would like to experiment with a SS backbone point-to-point link configuration, perhaps in the new 219 MHz range. One end would terminate at an internet gateway and the other at a nodestack. Many of us 'RF types' have the necessary test gear for the VHF/UHF bands and thus could get rolling much quicker than we could in the uwave regions.

Whatever is developed, it would be highly desireable to have diagnostics available, perhaps in the form of BER. This would allow the sysops to keep track of factors affecting link performance

73 de Jack

14. Re: [SS:957] What next? (was Re: Point(Tony Lanier))

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Mon, 3 Feb 1997 11:00:19 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.91.970203104910.11002C-100000@tekdata.com>
Rendered body type: text/plain

On Sat, 1 Feb 1997, Jeff King wrote:

>
> But the FreeWave was a decent radio.... I'm not so sure what I am hearing
> being discussed will even hold a candle to the FreeWave. For example, both
> radios mentioned are 2.4ghz units.... most hams were going to be frequency
> challenged at 900mhz let alone at 2.5ghz. I'm not saying I'm against 2.5ghz
> development, I just want folks to be aware we are talking two different
> animals. Also, both 2.5ghz radios mentioned are 100mw
> units, that and the reduction in sensitivity on both 2.5ghz units give
> the FreeWave a 30db advantage. Also add in the fact it was a lower cost
> radio and you come up with the same answer I did.... maybe we need to
> think about what direction we are going before we leap.

Actually, since you can use reflector antennas, IMHO is is probably a better band to use. Dishes are far less picky than Yagis are, have a better pattern, etc. The rule here is no feedline if possible.

In my experience though, if the best you can do is a 3db loss before the antenna, use a 50% larger diameter dish! In practice with smaller dishes, this works well, at the expense of beamwidth, which for a user might be a benefit. (Obviously a center-of-a-hub station can't use a dish!)

I wish more hams would play with microwaves. If you don't fear them, you'll find that they really aren't as difficult as many people let on. (For example: how many DSS systems are out there now? [2+ million] they run at over 12 GHz, and normal joe people can install them....)

>
> However, my primary concern is having a development path that a proprietary
> solution wouldn't give us.
>

Yup, but we need to keep in mind is that we are small, and they are big.. we are starting off at an disadvantage. BUT, part 97 rules are going to be less restrictive (hopefully!) so we as hams COULD use simpler systems. I really think what we are after are HIGH SPEED links more importantly than SS. If we use the microwave bands, we can use more BW, etc.. I hope any ham SS development will be for 1296 MHz or above..

15. Re: [SS:963] Re: Any TAPR Group Purchase

From: Tony McConnell <n3jly@erols.com>
Date: Mon, 3 Feb 1997 23:35:14 -0500
To: ss@tapr.org
Message-ID: <199702040435.XAA02023@smtp1.erols.com>
Rendered body type: text/plain

At 09:34 PM 2/1/97 -0600, you wrote:

>Randy Roberts wrote:

>>

>> OK folks, here goes -- ACTION, not talk!

>>

>> - Frequency Range: 24 to 34 MHz (TO BE USED with an OUTBOARD
>> LINEAR TRANSVERTER for operating frequency band.)

>>

>> - TX output Power: > +13 dBm (20mw) average

>>

>> - RX NF: < 3 dB

>>

An opinion opposed to Randy Roberts proposal said:

>The cool think about Spread Sectrum is that it's Omnipresent. Immune
>to noise but if your only pushing the 20mw that this guy is trying to
>sell you will be drowned in an ocean of noise floor when there is
>snow on the ground! I know because I was playing with these cards
>at 250mw with the winpy indoor antennea that they ship with the product.
>I was able to get 1800ft out of these puppies until there was snow
>on the ground. Neighboring microwave uplinks and cell phone pads
>reaked havock on me so I picked up a couple od colinear antenneas
>and a billateral amp for my main router. 10 Miles NO PROBLEM. I can
>get more milage from hopping from router to router. I am working on
>some code that will minimize collisions.

Please notice the proposal by Randy. he discribes a modulator/demodulator
and IF arrangement. this seems like a very sound way to go. with the ability
to softly control mode and width of spread. were talking about a band
independant
application.

Tony N3JLI

16. Robert's Proposal

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Mon, 3 Feb 1997 23:19:53 -0600
To: " Spread Spectrum "<ss@tapr.org>
Message-ID: <v03007811af1c76ad8868@[208.134.134.40]>
Rendered body type: text/plain

If someone thinks they can put together a design team to do the Robert's
design, TAPR would be interested in looking at the design/cost of such a
project.

Please send me e-mail to me if you think you have a group that can do this
and want to pursue the necessary _work_ in starting a project.

Until a design team can be formed to even look at the possibility of doing
the design, TAPR is not in a position to do anything with the proposal.

Cheers - Greg, WD5IVD
Pres. TAPR

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

17. Re: [SS:971] Robert's Proposal

From: bruce@satscan.com
Date: Tue, 4 Feb 1997 07:14:50 -0800
To: ss@tapr.org
Message-ID: <199702041514.HAA03624@satscan.com>
Rendered body type: text/plain

Why do we need a design team for something that has already been designed?

```
>Until a design team can be formed to even look at the possibility of doing
>the design, TAPR is not in a position to do anything with the proposal.
>
>Cheers - Greg, WD5IVD
>Pres. TAPR
>
>-----
>Greg Jones, WD5IVD
>Austin, Texas
>wd5ivd@tapr.org
>http://www.tapr.org/~wd5ivd
>-----
>
>
>
Bruce Weber, W7BCW, Satscan Corporation / Cascade Technology
PO Box 1109, Sultan WA 98294-1109 (360)-793-3433 FAX: 793-0359
```

18. Re: [SS:972] Re: Robert's Proposal

```
From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Tue, 4 Feb 1997 10:43:45 -0600
To: ss@tapr.org
Message-ID: <v03020701af1d12422784@[208.134.134.40]>
Rendered body type: text/plain
```

Okay -- we can talk about syntax.

A design is one thing and a group that takes it and does something with it is a different task, but still part of the design process. I believe it is all design until the unit is out the door for the rev 1 unit.

How about Layout ? Design for surface mount ? Locating mfg of parts ?
Pricing parts ? Can it be kitted or mfg with testing ? Docs written ?
Testing done on initial boards....etc, etc, etc.

If you don't like 'design' as a name -- chose project team.

If the design was already complete, then we would have it in our hand working -- right ? So, this seems to indicate that more work is required. If I have this wrong and the design is ready and working, then I think we need to look at finding a mfg like PacComm or someone else to start mfg now and not involve TAPR in the process at all. A mfg can get to market in a much quicker time than a TAPR project, simply the difference between volunteers working at night and on weekends and someone getting paid to work on it all day.

While there might be a basic design done, there is a lot more work that some 'group' is going to have to do before we even begin looking at whether TAPR does this or discussing the proposal that Randy made and signing something.

This type of project will not be done by a dislocated group of people connected over the Internet. Sorry to say this, but past experience indicates that a small project team or design group that is physically located in some near area (i.e. local telephone, can visit on the weekends) __especially for RF projects__ is needed if we want to get this thing done in less than a year. This is based on doing project like this with volunteers for over 5 years. After the initial questions are answered and something is alpha tested with radios talking back and forth then the next step of taking it further can happen.

Cheers - Greg

```
>Why do we need a design team for something that has already been designed?
>
>
>>Until a design team can be formed to even look at the possibility of doing
>>the design, TAPR is not in a position to do anything with the proposal.
>>
>>Cheers - Greg, WD5IVD
>>Pres. TAPR
>>
>>-----
>>Greg Jones, WD5IVD
>>Austin, Texas
>>wd5ivd@tapr.org
```


>><http://www.tapr.org/~wd5ivd>
>>-----
>>
>>
>>
>Bruce Weber, W7BCW, Satscan Corporation / Cascade Technology
>PO Box 1109, Sultan WA 98294-1109 (360)-793-3433 FAX: 793-0359

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

19. Re: SS:938 & SS:960

From: Randy Roberts <randyrf@sss-mag.com>
Date: Wed, 5 Feb 97 17:37 PST
To: ss@tapr.org
Message-ID: <2.2.16.19970206093650.0e97b1de@sss-mag.com>
Rendered body type: text/plain

Here's a little more ACTION for the SS adventuresome out there in TAPR-land:

I have posted schematics, PCB files & basic 16C64 microprocessor code up on my site for some of the SST-1 radio-modem -- for your viewing and downloading pleasure!

Take a look at: <http://sss-mag.com/whatsnew/nuissue.html#3>

A BARE PCB for the "Baseband" section of the SST-1 will be available soon at US\$39 each -- see above link for more info.

BTW, this project was originally dubbed the "VAPOR1" as a play on words -- it has now become the SST-1, but some of the files still have vapor'ish names :-)

73 for now,

Randy, KC6YJY

20. Link Correction

From: Randy Roberts <randyrf@sss-mag.com>
Date: Wed, 5 Feb 97 20:40 PST
To: ss@tapr.org
Message-ID: <2.2.16.19970206123929.3adf07c8@sss-mag.com>
Rendered body type: text/plain

OOPS! -:(

I goofed the CORRECT URL should be:

<http://sss-mag.com/whatsnew/nuindex.html#3>

My thanks to Lyle Johnson for catching this!

73 to one & all,

Randy

21. Low noise reciever RF front end

From: Carol Fields <fields@svpal.org>
Date: Thu, 6 Feb 1997 14:58:56 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.3.88.9702061401.A19379-0100000@svpal.svpal.org>
Rendered body type: text/plain

What technology is the low cost (under \$10)/high quality front end for a receiver of a SS receiver?

Gallium arsenide?

Bipolar?

HEMT?

Other?

How about Noise Factor of various semiconductor technologies?

Specifics: I see Mini-Circuits has a ERA-3 (non-surface mount) for under \$2 which has 16dB gain at 5Ghz. It also has other specs below:

NF db Typ: 4.5
IP3 dBm Typ: 23

It is interesting that ERA-3 has better gain than ERA-3SM (surface mount) and I wonder if this is due to the 1/4 turn curve in the ERA-3SM leads verses the straight wire leads of the ERA-3?
Is there anything better (How about NEC's CEL division?)?

FIELDS@SVPAL.ORG Home email account of Julian Fields

22. Low noise reciever RF front end

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Fri, 7 Feb 1997 08:40:13 -0800 (PST)
To: ss@tapr.org
Message-ID: <199702071640.AA231633613@hpsadr2.sr.hp.com>
Rendered body type: text/plain

From: Carol Fields <fields@svpal.org>

> What technology is the low cost (under \$10)/high quality front
> end for a receiver of a SS receiver?
> Gallium arsenide?
> Bipolar?
> HEMT?
> Other?
> How about Noise Factor of various semiconductor technologies?
>
> Specifics: I see Mini-Circuits has a ERA-3 (non-surface mount) for under \$2
> which has 16dB gain at 5Ghz. It also has other specs below:
> NF db Typ: 4.5
> IP3 dBm Typ: 23
>
> It is interesting that ERA-3 has better gain than ERA-3SM (surface mount)
> and I wonder if this is due to the 1/4 turn curve in the ERA-3SM
> leads verses the straight wire leads of the ERA-3?
> Is there anything better (How about NEC's CEL division?)?
>

The ERA and similar HBT parts have pretty good gain/\$ and generally nice performance, but....

There is presently a great deal of concern about the HBT process itself and early failure due to it.

It is very possible/likely that package parasitics provide the difference in performance. Particularly in higher frequency devices and in high gain, higher current (low Z) parts the common mode impedance gets important. For some devices (like Avantek microwave gain blocks) it is necessary to use board material thinner than 1/16" because of grounding via inductance limitations.

Glenn n6gn

23. Freq hopping support chips

From: Carol Fields <fields@svpal.org>
Date: Fri, 7 Feb 1997 15:19:34 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.3.88.9702071531.A8375-0100000@svpal.svpal.org>
Rendered body type: text/plain

Are there any integrated circuits that will
hop thru the 75 or 150 or more frequencies to generate
the frequency to mix down to intermediate frequency
as required for Part 15 on 2.4Ghz or 5Ghz band frequency hopper?

Or do the present vendors roll their own circuits by
mux'ing between 2 or 3 PLL's?

Not really going to build this anytime soon, but figured
somebody knew the low cost/easy way to do it.

It also seems that hitting 75 freq rapidly would be
quite a difficult task... not to mention the harder
task of having the reciever hit exactly the same
75 freq at the right time.

-Julian Fields

24. Re: [SS:978] Freq hopping support chips

From: wb9mjn@wb9mjn.ampr.org
Date: Fri, 07 Feb 97 22:40:26 UTC
To: ss@tapr.org
Message-ID: <12709@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Julian,

Altho a single PLL can synthesise 75 to 150 frequencies, on 2.4 and 5 Ghz, as you guessed the problem is how quick.

Yes, multiple PLL s are used, to achieve quick enuf hopping for fast FH systems. Each PLL in turn is preset, and with a saftey time, it is switched to the output as it is expected to have stabilised on channel.

At 5 Ghz, Fractional N synthesis PLLs may be neccassary for phase noise reasons.

Another way, would be to mix up a Direct Digital Synthesis synthesizer output. These can change frequency rapidly, but are limited in operating frequency. They also can be quite expensive for high purity, due to D/A costs.

Some of the SS chips i ve seen so far have a AFC, to counter synthesizer errors. At a megabaud or so on 2.4, and probably 5 GHz, too, this is not a great problem. For 50 KB or less on 915, I would think it can be. I did a 9600 Baud link on 1.2 Ghz not spread, and it certainly was a problem. In fact, I need to go over to one site next week sometime and tweak it in!

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

25. cheap WaveLAN cards?

From: jmorriso@bogomips.com (John Paul Morrison)
Date: Sat, 8 Feb 1997 16:00:42 -0800 (PST)
To: ss@tapr.org
Message-ID: <m0vtMhG-000TsoC@bogomips.com>
Rendered body type: text/plain

Does anyone know where it may be possible to get two or three ISA WaveLAN cards cheaply (used, discounts, special sales) for use by an amateur radio club?

thanks

BogoMIPS Research Labs -- bogosity research & simulation -- VE7JPM --
jmorriso@bogomips.com ve7jpm@ve7jpm.ampr.org jmorriso@ve7ubc.ampr.org

26. Harris Prism chip Set

From: Scott Elliott <ScottE@ix.netcom.com>
Date: Mon, 10 Feb 1997 10:36:58 -0700
To: "'SS'" <SS@tapr.org>
Message-ID: <01BC173E.5A6F5C30@den-co26-23.ix.netcom.com>
Rendered body type: text/plain

Greetings,

I've just joined the list and have a hardware question, but fist let me introduce my self. My technician call sign is KB0ZOE and it is fresh out of the shrink wrap. I am an electrical engineer at Laser Communications in Englewood, Colorado. My only experience with SS is with the old Proxim 902 MHz net cards (not a good experience).

I was wondering if anybody has looked at the Harris Prism DSSS chip set or used their PCMCIA demo card (<http://www.semi.harris.com>)? Their demo card used AMD's 802.11 MAC chip, does anybody have any thoughts on that chip or standard (<http://www.amd.com>)?

Thanks in advance,

Scott Elliott
KB0ZOE

27. Re: [SS:981] Harris Prism chip Set

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Mon, 10 Feb 1997 16:51:49 -0500
To: ss@tapr.org
Message-ID: <199702102151.QAA00560@Paris.GASD102designcenter>
Rendered body type: text/plain

```
> Greetings,  
>  
> I've just joined the list and have a hardware question, but fist let me introduce my self. My  
technician call sign is KB0ZOE and it is fresh out of the shrink wrap. I am an electrical engineer at  
Laser Communications in Englewood, Colorado. My only experience with SS is with the old Proxim 902 MHz  
net cards (not a good experience).  
>  
> I was wondering if anybody has looked at the Harris Prism DSSS chip set or used their PCMCIA demo card  
(http://www.semi.harris.com)? Their demo card used AMD's 802.11 MAC chip, does anybody have any  
thoughts on that chip or standard (http://www.amd.com)?  
>  
> Thanks in advance,  
>  
> Scott Elliott  
> KB0ZOE  
>  
>
```

Hi Scott,

Yes we have discussed the PRISM chipset. I have a pair of the chipsets and I will be using them for a project. I want to get up and running with them and then develop a more complex SS system. The only problem I have encountered with the PRISM chipset is the size of the parts: they are SMALL !!! If an adapter can be found to convert the parts to a dip-style package, then breadboarding shouldn't be a problem. I haven't contacted the appropriate people about availability of the eval boards (i.e. can I purchase just the p.c. board). The eval board leans to the 802.11 standard and I would rather use the chipset as a amateur SS springboard.

Tony KE4AT0

28. Re: [SS:981] Harris Prism chip Set

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Mon, 10 Feb 1997 19:00:24 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.970210185905.3991B-100000@uhf.wdc.net>
Rendered body type: text/plain

```
> Greetings,  
>  
> I've just joined the list and have a hardware question, but fist let me introduce my self. My  
technician call sign is KB0ZOE and it is fresh out of the shrink wrap. I am an electrical engineer at  
Laser Communications in Englewood, Colorado. My only experience with SS is with the old Proxim 902 MHz  
net cards (not a good experience).  
>  
> I was wondering if anybody has looked at the Harris Prism DSSS chip set or used their PCMCIA demo card  
(http://www.semi.harris.com)? Their demo card used AMD's 802.11 MAC chip, does anybody have any  
thoughts on that chip or standard (http://www.amd.com)?  
>  
> Thanks in advance,  
>  
> Scott Elliott  
> KB0ZOE  
  
Hi Scott:
```

Harris will be coming by our lab on friday with a set of their PCMCIA cards. Ask me again next week!

Bernie

29. Re: [SS:982] Re: Harris Prism chip Set

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Mon, 10 Feb 1997 19:02:16 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.970210190127.3991C-100000@uhf.wdc.net>
Rendered body type: text/plain

```
> SMALL !!! If an adapter can be found to convert the parts to a dip-style package, then
```

Would be nice, but at 2.4 GHz, the leads have too much inductance!

30. RE: 982] Re: Harris Prism chip Set

From: Scott Elliott <ScottE@ix.netcom.com>
Date: Mon, 10 Feb 1997 17:01:26 -0700
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BC1774.129E9840@SCOTT>
Rendered body type: text/plain

From: Tony Lanier
Sent: Monday, February 10, 1997 2:56 PM
To: ss@tapr.org
Subject: [SS:982] Re: Harris Prism chip Set

Hi Scott,

Yes we have discussed the PRISM chipset. I have a pair of the chipsets and I will be using them for a project. I want to get up and running with them and then develop a more complex SS system. The only problem I have encountered with the PRISM chipset is the size of the parts: they are SMALL !!! If an adapter can be found to convert the parts to a dip-style package, then breadboarding shouldn't be a problem. I haven't contacted the appropriate people about availability of the eval boards (i.e. can I purchase just the p.c. board). The eval board leans to the 802.11 standard and I would rather use the chipset as a amateur SS springboard.

Tony KE4ATO

Tony,

Boy, you sure are right about bread boarding 0.025" pitch surface mount IC's. The only way I know to handle them is to fire up the old CAD system and layout a board. If you need some help with a board I might be able to squeeze out some time.

I seem to remember that they do have their reference design sans the 802.11 MAC in a PCMCIA form factor. Without the MAC the card is, of course, not PCMCIA compatible. What you get out of it is just a bit stream. They also have a demo board for each chip. I suppose that you would just jumper all the boards together and fire it up.

The specs on the Prism reference design look good to me (e.g. the sensitivity of 87dBm should give it good range) but I don't pretend to have a firm grasp on what to look for. I've also seen some data sheets for AMI and Stanford Telecom but I'm not sure how to evaluate these with out a reference design. Are there any other chip sets that you could recommend?

As far as protocols, what has been done to support these SS chip set for AX.25 or other amateur protocols. I want to run what ever I do under NT so that throws me out of the main stream, I know, but I can always hope.

73

Scott KB0ZOE

31. Re: [SS:982] Re: Harris Prism chip Set

From: Lyle Johnson <lylej@azstarnet.com>
Date: Mon, 10 Feb 1997 18:53:42 -0700
To: ss@tapr.org
Message-ID: <3.0.32.19970210184942.0070c8c8@pop.azstarnet.com>
Rendered body type: text/plain

Tony,

I think breadboarding would be a problem with a DIP adapter. Some of these parts are operating at 2.4 GHz. I think the best bet may be to follow the Harris reference design up to the processor interface. If the AMD MAC chip isn't flexible enough to provide whatever protocol layers it ought to be responsible for, then we need to find another interface chip.

Cheers,

Lyle

32. TAPR SS-List Project?

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Mon, 10 Feb 1997 17:46:26 -1000
To: ss@tapr.org
Message-ID: <Pine.GS0.3.93.970210174346.13185A-100000@uhunix4>
Rendered body type: text/plain

After the problems with the group purchase, there was some discussion regarding developing of our own SS project. As I recall, the last two major items regarding an SS-list project were:

1) The generous proposal of KC6YJY regarding the 3 year use of his design.

2) A reality check by someone (WD5IVD?) regarding the difficulty a developing a hardware project across a large geographical area.

Is there (still) interest in jointly developing some universal SS building blocks for use by the amateur community?

The TNC made it easy for the average ham to get into packet. Most operators have little clue as to its inner workings, but they have made a tremendous impact on the amateur community as a whole.

While I am not suggesting we attempt to duplicate the success of the TNC, I believe we would be doing a great service to Amateurs if we developed some public domain, basic hardware designs that experimenters could rally around.

- Paul Beltrani, AH6NU

33. Looking for SS Chipset net sites

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Mon, 10 Feb 1997 17:47:48 -1000
To: ss@tapr.org
Message-ID: <Pine.GS0.3.93.970210174628.13185B-100000@uhunix4>
Rendered body type: text/plain

I am attempting to put together a web page pointing to SS chipsets and RF ICs people are interested in experimenting with, e.g. The Harris PRISM set, The RF Devices RF2423 100 mW SS Tx IC.

I am not attempting to include related chips such as pc interface chips or various protocol ICs.

If you know of a web or FTP site that has such info, I would appreciate it if you would email me its full url, e.g.
<http://www.semi.harris.com/prism.html> NOT www.semi.harris.com. In other words, I am looking for direct pointers to the information, not general web sites.

I will make these sites available from my page at
<http://www.pixi.com/~beltrani/ah6nu.htm>

Thanks.

- Paul Beltrani, AH6NU

34. Tech manual 916A

From: LARRY BUSH <LBUSH@eramp.net>
Date: Mon, 10 Feb 1997 22:03:18 -0600
To: ss@tapr.org
Message-ID: <2.2.32.19970211040318.006bd918@ERAMP.NET>
Rendered body type: text/plain

I need a Xerox copy of tech manual for General Radio model 916A RF impedance bridge. Will pay costs for copy and mail, etc.
Larry Bush, W5NCD
359 Arrowhead Point
Waco, Texas 76712
phone 817-848-5155
Fax # 817-299-1040

35. Re: [SS:983] Re: Harris Prism chip Set

From: Jeff King <jeff@mich.com>
Date: Mon, 10 Feb 1997 23:16:07 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970211041607.0071cae0@mail.mich.com>
Rendered body type: text/plain

At 06:02 PM 2/10/97 -0600, Bernie Doehner wrote:

>Hi Scott:

>

>Harris will be coming by our lab on friday with a set of their PCMCIA

>cards. Ask me again next week!
>
>Bernie
>

Is this the 'PRISM PC Card Wireless LAN'? In the ap note it wasn't clear if this was a ISA design or a PCMCIA design. It uses the AM79C930 MAC processor.

Anyone have one of these beasts yet? Lyle, did you? How much are the eval units going for... I think the eval unit is a two board set with WIN95 drivers.

-Jeff wb8wka

36. Re: [SS:989] Tech manual 916A

From: Jim Sanford <jsanfor@exis.net>
Date: Mon, 10 Feb 1997 23:34:48 -0500
To: ss@tapr.org
Message-ID: <32FFF6E8.A7E@exis.net>
Rendered body type: text/plain

LARRY BUSH wrote:

>
> I need a Xerox copy of tech manual for General Radio model 916A RF
> impedance bridge. Will pay costs for copy and mail, etc.
> Larry Bush, W5NCD
> 359 Arrowhead Point
> Waco, Texas 76712
> phone 817-848-5155
> Fax # 817-299-1040

Larry:

I may have one, but won't know until the weekend. (I'm on the road)
Give me a call Saturday afternoon, or send another email...
757-850-4939

73, Jim
wb4gcs@amsat.org

37. Re: [SS:990] Re: Harris Prism chip Set

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Tue, 11 Feb 1997 00:13:34 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.970211001038.4926A-100000@uhf.wdc.net>
Rendered body type: text/plain

>
> Is this the 'PRISM PC Card Wireless LAN'? In the ap note it wasn't clear
> if this was a ISA design or a PCMCIA design. It uses the AM79C930 MAC
> processor.

PCMCIA design.

> Anyone have one of these beasts yet? Lyle, did you? How much are the
> eval units going for... I think the eval unit is a two board set with
> WIN95 drivers.

Time for someone to write some Linux and BSD drivers :)

Bernie

38. Re: [SS:987] TAPR SS-List Project?

From: Stefano Coccon <coccpce@mailbox.nauta.it>
Date: Tue, 11 Feb 1997 08:32:45 -0800
To: ss@tapr.org
Message-ID: <33009F2D.6B57@mailbox.nauta.it>
Rendered body type: text/plain

Paul A Beltrani wrote:

>
> After the problems with the group purchase, there was some discussion
> regarding developing of our own SS project. As I recall, the last two
> major items regarding an SS-list project were:
>
> 1) The generous proposal of KC6YJY regarding the 3 year use of his
> design.
>

It is better to develop a device for operations in the high UHF band.

> 2) A reality check by someone (WD5IVD?) regarding the difficulty a
> developing a hardware project across a large geographical area.
>

It is really difficult, but why to reject 'a priori' a new challenge?

> Is there (still) interest in jointly developing some universal SS building
> blocks for use by the amateur community?
>

Yes of course.

> The TNC made it easy for the average ham to get into packet. Most
> operators have little clue as to its inner workings, but they have made a
> tremendous impact on the amateur community as a whole.
>

Why do not expand further on the impact?

> While I am not suggesting we attempt to duplicate the success of the TNC,
> I believe we would be doing a great service to Amateurs if we developed
> some public domain, basic hardware designs that experimenters could rally
> around.

Of course it is necessary to have a 'core group' for managing the whole project.

To start from already available building blocks it should be a good idea.

I suppose Hams must become more familiar with 'global systems' instead of 'night time soldering'.

Saluti. Stefano

39. Re: [SS:988] Looking for SS Chipset net sites

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Tue, 11 Feb 1997 04:54:21 -0500
To: ss@tapr.org, beltrani@hawaii.edu
Message-ID: <2.2.32.19970211095421.00648b44@mindspring.com>
Rendered body type: text/plain

At 09:56 PM 2/10/97 -0600, Paul wrote:

>If you know of a web or FTP site that has such info, I would appreciate it
>if you would email me its full url, e.g.
><http://www.semi.harris.com/prism.html> NOT www.semi.harris.com. In other
>words, I am looking for direct pointers to the information, not general
>web sites.
>
>I will make these sites available from my page at
><http://www.pixi.com/~beltrani/ah6nu.htm>
>

I have quite a few direct pointers on my page. The URL is below.

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
<http://www.mindspring.com/~lfry/part15.htm>

40. Re: [SS:993] Re: TAPR SS-List Project?

From: claudio <claudio@cln.it>
Date: Tue, 11 Feb 1997 13:49:09 +0100
To: ss@tapr.org
Message-ID: <33006AC5.2D84@cln.it>
Rendered body type: text/plain

Stefano Coccon wrote:

>
> I suppose Hams must become more familiar with 'global systems' instead
> of 'night
> time soldering'.

>
> Saluti. Stefano
-
ciao ti interessi anche tu di SS ? hai già fatto qualche esperienza o
come me che sto ancora cercando di capire la potenzialità del sistema.

ciao Claudio

| Claudio Ceravolo (IW5CEI)
Email claudio@cln.it

41. Re: [SS:990] Re: Harris Prism chip Set

From: Lyle Johnson <lylej@azstarnet.com>
Date: Tue, 11 Feb 1997 07:41:55 -0700
To: ss@tapr.org
Message-ID: <3.0.32.19970211073644.006f2180@pop.azstarnet.com>
Rendered body type: text/plain
Jeff,

We got the eval set back in December at work. We hope to get it fired up this week :-). It consists of a pair of PCMCIA cards, no antennas (not certified...), a set of software to exchange data under DOS (might be windows) and gather statistics, etc. We also have a guy from Harris coming to our office who is supposed to be pretty knowledgeable on the PRISM chip set sometime in the next week or so.

We have looked at the ATMEL chipset (a non-starter, basically only good for cordless phones). There are other firms out there with a number of other solutions, but none seem as comprehensive as PRISM.

I'll post some results of our testing here when we get some results :-)
Cheers,

Lyle

At 10:22 PM 2/10/97 -0600, you wrote:
>At 06:02 PM 2/10/97 -0600, Bernie Doehner wrote:
>
>>Hi Scott:
>>
>>Harris will be coming by our lab on Friday with a set of their PCMCIA
>>cards. Ask me again next week!
>>
>>Bernie
>>
>
>Is this the 'PRISM PC Card Wireless LAN'? In the ap note it wasn't clear
>if this was a ISA design or a PCMCIA design. It uses the AM79C930 MAC
>processor.
>
>Anyone have one of these beasts yet? Lyle, did you? How much are the
>eval units going for... I think the eval unit is a two board set with
>WIN95 drivers.
>
>-Jeff wb8wka
>
>

42. Project?

From: Scott Elliott <ScottE@ix.netcom.com>
Date: Tue, 11 Feb 1997 09:37:52 -0700
To: "SS" <SS@tapr.org>
Message-ID: <01BC17FF.431C78D0@den-co32-38.ix.netcom.com>
Rendered body type: text/plain

I have some thoughts on doing a SS project with the Harris reference design.

1. A known good design with known good hardware is available.
2. Harris has plans to OEM the PCMCIA cards. They have no interest in supporting a mass of uneducated end users, but they might be receptive to an organization of hams (TAPR?) ordering and self-supporting them. Harris has put a lot of effort to make Prism succeed and if presented properly Harris should be able to be educated that supporting Hams is in their best interest. At OEM prices the system could be

very low cost.

3. Laying-out an ISA card from the reference should be straight forward. It should be kept in mind that any custom hardware that is done at these frequency (part 15) must be tested for FCC type approval and given the RFI that a bad design could radiate a Part 97 design should be tested. Hopefully donated test time could be found. Given the fine pitch of the chips assembly of these boards will not be a Saturday afternoon kind of thing. A commercial assembly house may have to be used. I might be able find the time to design this board.

4. The fly in the ointment is the AMD Am79C930 media Access Controller (MAC). AMD has drivers for Xircom's Netwave and 802.11. Source code is available for several operating systems. I've had little chance to dig into the spec sheet (160 pages from their web site www.amd.com) but I assume that AX.25 could map into one of the supported frames with little pain.

Scott Elliott - KB0ZOE

43. The Quest:Ethernet Tbase2 Hw-media standard?!

From: "Marcel Bos" <mackel@hotmail.com>
Date: Tue, 11 Feb 1997 09:01:55 -0800 (PST)
To: ss@tapr.org
Message-ID: <199702111701.JAA00506@f13.hotmail.com>
Rendered body type: text/plain

Wonder. What is Ethernet? Whats Inside that RG58 cable.. what would that signal be/look like on a spectrum scope? Can I perhaps modulate a transmitter with it?

Any old projects with this?

Get Your *Web-Based* Free Email at <http://www.hotmail.com>

44. The Quest:Ethernet Tbase2 Hw-media standard?!

From: "Marcel Bos" <mackel@hotmail.com>
Date: Tue, 11 Feb 1997 09:05:11 -0800 (PST)
To: ss@tapr.org
Message-ID: <199702111705.JAA00105@f27.hotmail.com>
Rendered body type: text/plain

Wonder. What is Ethernet? Whats Inside that RG58 cable.. what would that signal be/look like on a spectrum scope? Can I perhaps modulate a transmitter with it?

Any old projects with this?

Get Your *Web-Based* Free Email at <http://www.hotmail.com>

45. Re: [SS:997] Project?

From: Bob Lorenzini <hwm@netcom.com>
Date: Tue, 11 Feb 1997 13:06:13 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970211130111.243B-100000@mm.wd6dod.ampr.org>
Rendered body type: text/plain

On Tue, 11 Feb 1997, Scott Elliott wrote:

> I have some thoughts on doing a SS project with the Harris reference design.
>
>
> Scott Elliott - KB0ZOE

This sounds very attractive. I'am assuming your refering to the 900mhz band and I'am hopeing we could acheive the 1 watt power level even if that meant an outboard amp to the pcmcia card.

Bob - wd6dod

46. RE: 1000] Re: Project?

From: Scott Elliott <ScottE@ix.netcom.com>
Date: Tue, 11 Feb 1997 15:55:55 -0700
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BC1834.13A49350@den-co32-38.ix.netcom.com>
Rendered body type: text/plain

Bob,

The Harris set works on 2.45 GHz not 800 MHz.

Scott

From: Bob Lorenzini
Sent: Tuesday, February 11, 1997 2:05 PM
To: ss@tapr.org
Subject: [SS:1000] Re: Project?

On Tue, 11 Feb 1997, Scott Elliott wrote:

> I have some thoughts on doing a SS project with the Harris reference design.
>
>
> Scott Elliott - KB0ZOE

This sounds very attractive. I'am assuming your refering to the 900mhz band and I'am hopeing we could acheive the 1 watt power level even if that meant an outboard amp to the pcmcia card.

Bob - wd6dod

47. SS Eval board pricing

From: Jeff King <jeff@mich.com>
Date: Tue, 11 Feb 1997 19:52:03 -0500
To: ss@tapr.org
Cc: ss-sta@tapr.org
Message-ID: <2.2.32.19970212005203.00708468@mail.mich.com>
Rendered body type: text/plain

So far, the only pricing I recieved is for the PRISM chip set from Harris. This is a 1-4megabit DSSS 2.45mhz chipset doing 100-250mw.

The PRISMEVAL-1 includes two radios with extender boards (PCMCIA) and software for \$1395. A standard SMA connector is included which of course means its not a Part 15 device (but would comply with the STA I assume). They also have another (similar) eval unit without the extender for \$995. The antenna on this one is intergral so it may be of less interest. This also has two units with the kit.

I believe the PRISM1EVAL is the same kit a number on here already have. Look forward to your reports. I'm trying to get one now.

BTW, the parts of the chipset might be useful with Randy Roberts project. Specifically, the LNA, amp, T/R switch and maybe the upconverter.

Regards,

| Jeff King Aero Data Systems |
| jeff@mich.com P.O. Box 510895 |
| (810)471-1787 Livonia, MI 48151 |
F(810)471-0279 United States

48. SS of course

From: Tony McConnell <n3jly@erols.com>
Date: Tue, 11 Feb 1997 20:32:15 -0500
To: ss@tapr.org
Message-ID: <199702120132.UAA21560@smtp1.erols.com>
Rendered body type: text/plain

Hello,

What are the charactoristics or design goals that we should be seeking to meet in planning a SS system?

How fast?

How far, with what power?

What immunity?

Tony McConnell N3JLI

49. RE: 982] Re: Harris Prism chip Set

From: David Dennis <ddennis@metronet.com>
Date: Mon, 10 Feb 1997 21:52:14 -0600
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BC1865.1E892840@dal46.metronet.com>
Rendered body type: text/plain

From: Scott Elliott[SMTP:ScottE@ix.netcom.com]
Sent: Mon, February 10, 1997 6:01 PM
To: 'ss@tapr.org'
Subject: RE: 982] Re: Harris Prism chip Set

I seem to remember that they do have their reference design sans the 802.11 MAC in a PCMCIA form factor. Without the MAC the card is, of course, not PCMCIA compatible. What you get out of it is just a bit stream. They also have a demo board for each chip. I suppose that you would just jumper all the boards together and fire it up.

Scott KB0ZOE

I hate to admit my ignorance in front of so many people, but I'm not familiar with IEEE 802.11. What exactly does it define?

50. I must be wrong ?

From: Jacques PHILIPPE <jphilip@ibm.net>
Date: Wed, 12 Feb 1997 13:02:13 +0100
To: ss@tapr.org
Message-ID: <3301B145.5D98@ibm.net>
Rendered body type: text/plain

Hello,

I read about SS gain. When I made some gain calculations, I cannot believe my results.

Lets assume I use FHSS (Frequency Hopping Spread Spectrum) for CW on 10 meters between 28 and 29 MHz with a 100 watts transmitting power.

The necessary band for CW is 100 Hz; I spread it over 1MHz

gain : $1,000,000/100 = 10,000 \rightarrow 40\text{dB}$

Do this means that my spreaded 100 watts will have the same efficiency as $100 * 10,000 = 1,000 \text{ KW}$ (one thousand kilowatts ;-) of non spreaded power ?

I must be wrong somewhere ! Wake me up ;-) !

Yet, I read about GPS ... knowing the GPS satellites travel at 20,000 Km ... and when I look at GPS antenna ... could be true !

Bye de Jacques on4kjp@ibm.net

51. Re: [SS:1002] SS Eval board pricing

From: RLANIER@mailb.harris.com (RLANIER)
Date: Wed, 12 Feb 1997 10:36:49 -0500
To: ss@tapr.org
Message-ID: <301e4230@mailb.harris.com>
Rendered body type: text/plain

>The PRISMEVAL-1 includes two radios with extender boards (PCMCIA) and
>software for \$1395. A standard SMA connector is included which of
>course means its not a Part 15 device (but would comply with the
>STA I assume). They also have another (similar) eval unit without
>the extender for \$995. The antenna on this one is intergal so

>it may be of less interest. This also has two units with the
>kit.

Has anyone checked on getting
samples of the PRISM chipset? I was
able to obtain 2 sets (without a
PWB).

Just curious,

Tony KE4ATO

52. RE: 1004] RE: 982] Re: Harris Prism chip Set

From: Scott Elliott <ScottE@ix.netcom.com>
Date: Wed, 12 Feb 1997 08:55:54 -0700
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BC18C2.9461A300@den-co32-38.ix.netcom.com>
Rendered body type: text/plain

From: David Dennis
Sent: Tuesday, February 11, 1997 8:58 PM
To: ss@tapr.org
Subject: [SS:1004] RE: 982] Re: Harris Prism chip Set

I hate to admit my ignorance in front of so many people, but I'm not =
familiar with IEEE 802.11. What exactly does it define?

Davis,

802.11 is much like ethernet, Token bus (802.4) or token ring (802.5). 802.11 is a new protocol that is
intended for the special needs of RF communication. 802 defines the media access controller (MAC).
The MAC is half of ISO Reference model layer two called the Data Link Layer
(<http://munshi.sonoma.edu/s96/bus420/osilecture.html>). The other half of layer two is Link Access
Protocol. On a PC this is typically the ethernet drivers that you install. Another example of a LAP is
an AX.25 type protocol written NJ7P, N7LEM and N700 (lapa.txt in the tapr FTP area).

For an example of a MAC you can check out <http://www.amd.com/html/overview/corpapr/9669.html>.

Scott KB0ZOE

53. Re: [SS:987] TAPR SS-List Project?

From: RLANIER@mailb.harris.com (RLANIER)
Date: Wed, 12 Feb 1997 10:57:54 -0500
To: ss@tapr.org
Message-ID: <301e89c0@mailb.harris.com>
Rendered body type: text/plain

>Is there (still) interest in jointly developing some universal SS building
>blocks for use by the amateur community?

YES!!!!

At least I am, anyway.

Tony KE4ATO

54. Re: [SS:990] Re: Harris Prism chip Set

From: RLANIER@mailb.harris.com (RLANIER)
Date: Wed, 12 Feb 1997 11:00:52 -0500
To: ss@tapr.org
Message-ID: <301e9780@mailb.harris.com>
Rendered body type: text/plain

>Is this the 'PRISM PC Card Wireless LAN'? In the ap note it wasn't clear
>if this was a ISA design or a PCMCIA design. It uses the AM79C930 MAC
>processor.

>-Jeff wb8wka

Its a PCMCIA design. Its made to plug into a laptop and used as a
wireless modem.

But I can have other applications, such as amateur uses :)

55. Re: [SS:1006] Re: SS Eval board pricing

From: Jeff King <jeff@mich.com>
Date: Wed, 12 Feb 1997 12:17:56 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970212171756.006c62a4@mail.mich.com>
Rendered body type: text/plain

At 09:41 AM 2/12/97 -0600, RLANIER wrote:

>Has anyone checked on getting
>samples of the PRISM chipset? I was
>able to obtain 2 sets (without a
>PWB).
>
>Just curious,
>
>Tony KE4AT0

Didn't you just answer your own question?
Since you got samples I assume they are available.

IBM laid out the board (PWB) for the eval units harris
is selling and artwork is not available. However,
Harris provides a schematic in Orcad format so you
could do it yourself although the assembly due to
the small pitch size would not be a kitchen table
project.

The chip set is sold in 48 unit "tubes" although you
can buy the parts individually. The chip set in
Q 10,000 is about \$52.00 US.

-Jeff

56. Re: [SS:988] Looking for SS Chipset net sites

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Wed, 12 Feb 1997 08:36:45 -1000
To: ss@tapr.org
Message-ID: <Pine.GS0.3.93.970212083120.12177A-100000@uhunix4>
Rendered body type: text/plain

On Mon, 10 Feb 1997, Lee W. Fry wrote:

> At 09:56 PM 2/10/97 -0600, Paul wrote:
>
> >If you know of a web or FTP site that has such info, I would appreciate it
> >if you would email me its full url, e.g.
>...
> >I will make these sites available from my page at
> ><http://www.pixi.com/~beltrani/ah6nu.htm>
> >
>
> I have quite a few direct pointers on my page. The URL is below.
>
> Lee W. Fry AA0JP
> lfry@mindspring.com
> See my Part 15 Spread Spectrum Device Compendium at:
> <http://www.mindspring.com/~lfry/part15.htm>

I looks like I was going to reinvent the wheel. Mr. Fry's page is
exactly what I had in mind. In addition, he covers more chips that I was
aware of. Definitely worth checking out if your looking for hardware to
experiment with.

- Paul Beltrani, AH6NU

57. ABACOM Technologies

From: "John A. Hansen" <hansen@fredonia.edu>
Date: Wed, 12 Feb 1997 16:18:31 -0500
To: ss@tapr.org
Message-ID: <330233A7.35@fredonia.edu>
Rendered body type: text/plain

Has anyone heard of ABACOM Technologies? They have an ad in this
month's

Nuts and Volts. They claim to be selling a data transceiver with an RS-232 interface that will run from 4,800 to 38,800 bps half duplex with .25 mW output on either 418 or 433 MHz for \$139.30.

They are also advertising a "64 Channel, Synthesized Module" for 2.4 GHz Spread Spectrum at 1 Mbs. No price is given. I tried calling, but got an answering machine.

Anybody know anything about these guys?

John WA0PTV

58. Goals

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Wed, 12 Feb 1997 18:42:53 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970212234253.003296b8@mindspring.com>
Rendered body type: text/plain

Have we lost sight of what our goals need to be?

We have a STA that right now is good for 6 months. The STA relieves us of the current rules in 4 areas:

- Removes the requirement to transmit station identification signals by a CW or phone emission;

- Permits spread spectrum emissions on amateur radio bands 50-54 MHz, 144-148 MHz, 219-220 MHz and 222-225 MHz;

- Provides for transmission of hybrid spread spectrum emissions; and

- Permits the use of other spreading codes.

Shouldn't our goal be to demonstrate the practicability of granting a permanent rules change along the lines of the STA? What are we doing that specifically addresses collecting data to support the rules change process?

Initial direction was a group buy of 900 MHz devices and a lot of people putting up WLANs using various routers and antennas. Nice useful experience, but what rules change are we addressing? So far all we might be able to claim is that our higher gain (higher than part 15 allows) 900 MHz units aren't bothering anybody who isn't bothered already. A lot of people are getting really good TCP/IP networking experience, but that doesn't buy us rule changes.

With that said, I'll throw out a couple of suggestions. What about voice comms? No computer, protocol stacks, or arcane networking knowledge needed. Just a CODEC driving the unit and you are on your way. Technology might be easily cobbled from SS cordless phones. I really like the idea of a unit that puts out a nice IF like Robert's design. With transverters we could get up in many different bands and see who we affect. Might even be able to involve some of the weak signal guys who normally use transverters in their designs.

If you want to get some idea of what the FCC is going to hear if a NPRM comes out, there was a long bunch of SS related threads on the VHF reflector in late November and early December. I have HTMLized these and put them up at: <http://www.mindspring.com/~lfry/SS/SSThread.html>. Take a look. It will come down to arguments about the "noise floor".

By the way, TCP/IP, or possibly mobile IP or TACO 2 on Linux based routers over a 2.4 GHz 2 Mbps WLAN is my interest, but I'm worried about us getting the Part 97 rules changes needed to enable me play with this on down the line.

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
<http://www.mindspring.com/~lfry/part15.htm>

59. Re: [SS:1013] Goals

From: "Robert A. Buaas" <buaas@wireless.wdc.net>
Date: Wed, 12 Feb 1997 18:28:30 -0800 (PST)
To: ss@tapr.org
Message-ID: <199702130228.SAA18280@wireless.wdc.net>
Rendered body type: text/plain

[large, well thought out section snipped]

>If you want to get some idea of what the FCC is going to hear if a NPRM
>comes out, there was a long bunch of SS related threads on the VHF reflector
>in late November and early December. I have HTMLized these and put them up
>at: <http://www.mindspring.com/~lfry/SS/SSThread.html>. Take a look. It
>will come down to arguments about the "noise floor".

>Lee W. Fry AA0JP

Lee--

I completely concur with your last statement. It is unfortunate, because it is particularly this problem that is the most misunderstood by those that would vote against SS. If we are to win the NPRM fight, we MUST field "existence proofs" on the most popular bands (144, 220, 440) that demonstrate that SS is no threat to the existing users. While it's nice to play with 900 and 2.4 Gz commercial systems (which, I admit, provide considerable hands-on performance experience, not to mention high throughput compared to current narrowband modes), going this direction does little toward the goal of getting the STA into the Rules, and getting SS accepted generally.

My \$.02.

best regards to all/bob K6KGS

60. RE: 1012] ABACOM Technologies

From: David Dennis <ddennis@metronet.com>
Date: Wed, 12 Feb 1997 21:18:24 -0600
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BC192C.526C0E80@dal85.metronet.com>
Rendered body type: text/plain

From: John A. Hansen[SMTP:hansen@fredonia.edu]
Sent: Wed, February 12, 1997 9:20 AM
To: ss@tapr.org
Subject: [SS:1012] ABACOM Technologies

They are also advertising a "64 Channel, Synthesized Module" for 2.4 GHz Spread Spectrum at 1 Mbs. No price is given. I tried calling, but got an answering machine.

Anybody know anything about these guys?

John WA0PTV
+++++
The wording on this is strange but 1Mb/s sounds interesting.
I'd have to see to believe.

61. Interesting Ph.D. Thesis available

From: "Robert A. Buaas" <buaas@wireless.net>
Date: Thu, 13 Feb 1997 08:01:36 -0800 (PST)
To: ss@tapr.org
Message-ID: <199702131601.IAA14027@wireless.net>
Rendered body type: text/plain

Gang--

try reading <http://cas.et.tudelft.nl:8080/~glas/thesis> and
<http://cas.et.tudelft.nl:8080/~glas/isssta>. The author's
home page is at .../~glas. He's a recent Ph.D graduate of
the Technical University at Delft (NL), moved here to Bell Labs.
These papers are very interesting/informative reading.
(Greg: I recommend adding these links to the TAPR/ss Web page)

best regards/bob

62. Re: [SS:1005] I must be wrong ?

From: wb9mjn@wb9mjn.ampr.org
Date: Thu, 13 Feb 97 12:20:49 UTC
To: ss@tapr.org
Message-ID: <12803@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Jacques,

No, that's not right. The 40 dB processing gain is your interference tolerance in your case. A broadband noise source would need 1000 KW to have equal power to the despread FH signal. There is no free ride here. The 100 watt W station has the same communications capability, against natural noise sources as a 100 watt FH CW station with 40 dB processing gain (or any processing gain).

GPS satellites have a baseband data rate of 9600 baud. So, that's just like a Pacsat station. There are other system parameters, which I could not get right, off the cuff, but suffice it to say, spread and despread, the signals are similar to a 435 Mhz pacsat.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA

AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]

Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

63. 2.4 ghz unit?

From: arutz@shfmicro.com (alan rutz)
Date: Thu, 13 Feb 1997 18:28:48 -0600
To: ss@tapr.org
Message-ID: <199702140028.SAA14924@alice.adsnet.com>
Rendered body type: text/plain

<http://www2.seeder.net.tw/yoyo/PCMCIA.htm> was something I found this evening.

Sorry if this duplicates anyone else's messages, but look it over if you want.

It's a 2.4 ghz DSSS PCMCIA card at a reasonable cost. de alan, wa9gka

64. Bounced?

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Fri, 14 Feb 1997 20:07:08 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970215010708.00355044@mindspring.com>
Rendered body type: text/plain

My ISP had some mail server problems 2/13 and I found I was bounced off of some lists. Although the listserver tells me I am subscribed, I've seen nothing past [SS:1016]. I am posting this to see if this list was one that bounced me. Thanks for your patience all. AA0JP

Lee W. Fry AA0JP

lfry@mindspring.com

See my Part 15 Spread Spectrum Device Compendium at:

<http://www.mindspring.com/~lfry/part15.htm>

65. V-Link by YES! Entertainment

From: N5RG@aol.com
Date: Sat, 15 Feb 1997 01:35:08 -0500 (EST)
To: ss@tapr.org
Message-ID: <970214175459_1314918712@emout19.mail.aol.com>
Rendered body type: text/plain

Hello,

A couple of weeks ago the first WalMart opened in Boise. My wife and I went over to check it out the second day it was open. Of course one of the first places I visited was the Electronics section.

They had quite a few neat and interesting items. One item that caught my eye was

a small handheld unit that looked a lot like the smallest of the cellular phones

currently available. I started reading the box and became intrigued by the description. Here are some of the specifications:

Range: 3 blocks
Voice mail: send and/or receive voice mail up to 20 sec in length
Display: LCD
Addressing: Set your own address and the address of the V-Link unit to call
Signal: Either tone or buzzer (when being called)

The address of the received station is displayed on the LCD screen

Either a private (to addressed station only) or public (everybody) message

can be sent.

V-LINK emulates the operation of a cellular phone.

Price: \$69.96.

There is no indication on the outside of the box as to what kind of radio this is.

It does not say AM, FM, or Spread Spectrum. I asked a WalMart employee to open the box to see what the instructions say. The enclosed instructions did not say what the modulation scheme is or indicate what frequency is used.

There does not appear to be a push to talk switch, only an off-low-high switch.

The manufacturer is YES! Entertainment Corp. I did some Net Surfing and found that on Dec 20, 1996, YES! had made a deal with the FCC to allow the continued sale of V-LINK. It seems they had started selling V-Link before they had received the FCC certification. They had to pay a \$31,000 fine.

I also learned that YES! Entertainment is primarily a toy manufacturing Company and that they are marketing the V-LINK to teenagers so they can stay in touch with their friends.

I called the 800 number on the box and asked the young lady who answered if she could give me some technical info on the V-LINK. She said it used rf at 900 Mhz and that the system could only handle 20 addresses at the same time. I was told that technical info about the rf portion of V-LINK was company proprietary and she did not think I could get any info about it.

So I am now quite curious as to whether or not it uses Spread Spectrum. It seems to be quite a bit smarter than an old fashioned CB or 49 Mhz walkie-talkie. The use of addressing and the public/private feature indicate a fairly high level of smarts to me.

If it turns out to actually be a spread spectrum device, won't it be interesting if my first spread spectrum radio was manufactured to be a toy?

73, Roy W7IDM, ex N5RG

66. Re: [SS:1020] V-Link by YES! Entertainment

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Sat, 15 Feb 1997 06:19:14 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970215111914.0034dc5c@mindspring.com>
Rendered body type: text/plain

At 12:39 AM 2/15/97 -0600, Roy, W7IDM wrote:

>So I am now quite curious as to whether or not it uses Spread Spectrum.
>It seems to be quite a bit smarter than an old fashioned CB or 49 Mhz
>walkie-talkie. The use of addressing and the public/private feature
>indicate a fairly high level of smarts to me.
>

They're not Spread Spectrum. The scanner buffs figured this one out real quickly. A quick Deja News search turns up the following post by "Robert H. Eisner" <rheisner@worldnet.att.net> to rec.radio.scanner:

Begin Quoted Message-----

Subject: Re: V-Link
From: "Robert H. Eisner" <rheisner@worldnet.att.net>
Date: 1997/02/06
Message-Id: <32FA978C.6DBE@worldnet.att.net>
References: <01bc149d\$12d06700\$6d7c48a6@IBM.IBM.NET>
To: Jim Murray <James31@ibm.net>
Content-Type: text/plain; charset=us-Ascii
Organization: AT&T WorldNet Service
Mime-Version: 1.0
Reply-To: rheisner@worldnet.att.net
Newsgroups: rec.radio.scanner
X-Mailer: Mozilla 3.0 (Win95; U)

Jim Murray wrote:

>
> Anybody got any info on the new Vlink system that WalMart is pushing?

The following is a list of frequencies for the new V-Link phones from "YES! Entertainment Corp". The Phones (Walkie-Talkies) run around \$70 and can be purchased at Toys R US, WalMart and EBX stores. An optional Nicad Battery with Charger can also be purchased for an additional \$30.

916.8750	Calling Channel 1 (Main/Home Frequency)
915.8625	Calling Channel 2
915.0000	Calling Channel 3
914.0875	Calling Channel 4
913.3375	Calling Channel 5
912.0000	Calling Channel 6
910.9125	Calling Channel 7
910.2375	Calling Channel 8
909.3375	Calling Channel 9
908.5000	Calling Channel 10
907.6625	Calling Channel 11
907.0000	Calling Channel 12
906.3375	Calling Channel 13
905.6625	Calling Channel 14
904.5000	Calling Channel 15
904.0000	Calling Channel 16
903.4875	Calling Channel 17
903.0000	Calling Channel 18
902.5000	Calling Channel 19

I obtained a set from Toys R US and found that they're using 916.875 Mhz for the main calling frequency. The units seem to switch to another frequency only if you two party lines were active at the same time.

If you place the phones in Private mode, they switch frequencies once a link has been established between two phones.

The phones do not appear to be using DCS or CTCSS.

I've also noticed that if a link goes inactive (you haven't keyed the link switch for over 10 seconds) the units get lost, and unless both parties hit the clear switch, there doesn't appear to be away for the two parties to establish another connection.

They also have a maximum range of 1000 feet at best! (NOT 3 blocks!)

For the money that you will be paying, I would recomend an FRS radio from Motorola or Midland.

Bob

End Quoted Message-----

Also, WA1YKL posted:

Begin Quoted Message-----

ubject: Re: V-tech kid phones
From: "sdonnell@nh" <sdonnell@ultranet.nh.com>
Date: 1996/11/30
Message-Id: <329FBF78.1B14@ultranet.nh.com>
References: <575727\$ib8@dfw-Ixnews5.ix.netcom.com>
<Pine.OSF.3.91.961122142243.30948A-100000@ucs.orst.edu>
<57ni39\$sp7@relay.ttc.com>
To: Bryan Crider <criderb@ttc.com>
Content-Type: text/plain; charset=us-Ascii
Organization: www.nh.ultranet.com
Mime-Version: 1.0
Newsgroups: rec.radio.scanner,alt.radio.scanner
X-Mailer: Mozilla 2.01 (Win95; U)

The V-Link phones as they are called are a very interesting form of "kiddie talkie". I suspect these could be intended to compete directly with UHF FRS radios. We got one the other day and played with it quite a bit. Yes, 916.875 MHz is their calling/standby freq. They also have 15 other channels on freqs all the way down to 903.48 Mhz that they use on an as needed basis for "private" links and depending on other users/interference on the other CHs. They use good ol analog Wide FM (25 KHz deviation) for voice transmission. CTCSS/DCS is not used for

selective(private) calling. Instead, they have a high speed digital ANI code burst that is sent at the beginning of an initial transmission and anytime the CH remains inactive for 10 seconds or so. The ANI data burst is apparently how the units instruct others as to what freq to switch to for private conversations. Hardly all too private though... One cute feature they have is digital voice storage, to save messages when the user is not available. I wonder if these might become popular with certain drug gangs...

The transmit power level from the V-Link is only about .2 milliwatts, so I can't say they the reported "3 blocks" range is not stretching it a bit far. Being a licensed Amateur, I have the option of removing the hardwired antenna and replacing it with an SMA receptical to permit attaching it to better antennas and or amplifiers

73s DE WA1YKL

End Quoted Message-----

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
<http://www.mindspring.com/~lfry/part15.htm>

67. Re: [SS:1021] Re: V-Link by YES! Entertainment

From: N5RG@aol.com
Date: Sat, 15 Feb 1997 11:05:18 -0500 (EST)
To: ss@tapr.org
Message-ID: <970215110517_1678469813@emout08.mail.aol.com>
Rendered body type: text/plain

Lee:

Thank you very much for your quick reply to my query about the V-LINK radio. I can now stop worrying about what they are.

73, Roy W7IDM, ex N5RG

> They're not Spread Spectrum. The scanner buffs figured this one out real
> quickly. A quick Deja News search turns up the following post by "Robert
H.
> Eisner" <rheisner@worldnet.att.net> to rec.radio.scanner:
>

68. SS data acq review article

From: David G Taylor <taylord@ecn.purdue.edu>
Date: Mon, 17 Feb 1997 10:50:56 -0500 (EST)
To: ss@tapr.org
Message-ID: <v03007804af2de65e1c0b@[128.46.169.162]>
Rendered body type: text/plain

It's been a quiet week at Lake SS.....

In the Feb 97 Personal Engineering & Instrumentation News, the cover spotlight is on SS, including a lengthy article describing the technology and challenges in using wireless data links. Hardware includes modems and LANs, DS and FH, 900 & 2400 MHz. The issue is sprinkled with ads from the manufacturing players.....

73 de David KB9KNS (Am cordless; will travel.)
--taylord@ecn.purdue.edu

69. FreeWave

From: Fred Treasure <fred@astro.wnmu.edu>
Date: Mon, 17 Feb 1997 18:30:12 -0700 (MST)
To: ss@tapr.org
Message-ID: <199702180130.SAA01385@a202.wnmu.edu>
Rendered body type: text/plain

I purchased two FreeWave 915 MHz SS transceivers to evaluate under the STA. While they were not a bargain compared to the (failed) TAPR purchase, they are still a very good deal in terms of performance for the dollar. The transceivers have a number of very useful link diagnostics built into them, including:

1. Noise level measurement.
2. Signal level measurement.
3. Percentage of packets received.
4. Number of disconnects.

The units can also operate in a continuous 'ping' mode. This allowed me to set up one end of the link as a reference node. I could then drive around with the other transceiver plugged into the cigar lighter. The unit shows via the front panel LEDs when the link is connected and by the brightness of one of the LEDs the link quality. No computer or any other test equipment is required. This feature made path testing a pleasure.

As a real-world test I replaced an existing 42 kilometer 9600 bps 440 MHz link with the FreeWaves. The path is difficult because it does not have a line-of-sight path. The 9600 link was marginal. The FreeWaves running at 115,200 bps work fine. This is very impressive performance.

It should be noted that these units did not interfere with the existing 440 voice repeater at the same site. Likewise they created no problems with our 440 and 145 packet gear. The FreeWaves were not affected by the 10 kilowatt commercial FM station on the same tower.

I had hoped to run more tests with the units but they seem to have found a permanent home replacing the 9600 bps link. I'm saving my money for another pair to try on a even longer line-of-sight path...

Fred Treasure, KE5CI
sysop@astro.wnmu.edu

70. Re: [SS:1024] FreeWave

From: Bob Lorenzini <hwm@netcom.com>
Date: Mon, 17 Feb 1997 18:38:14 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970217183624.386A-100000@mm.wd6dod.ampr.org>
Rendered body type: text/plain

>I purchased two FreeWave 915 MHz SS transceivers to evaluate under the
>STA.
>While they were not a bargain compared to the (failed) TAPR purchase,
>they are still a very good deal in terms of performance for the dollar.

Are we talking ~\$1300@ here ?

Bob - wd6dod

71. Re: [SS:1025] Re: FreeWave

From: Fred Treasure <fred@astro.wnmu.edu>
Date: Mon, 17 Feb 1997 22:49:23 -0700 (MST)
To: ss@tapr.org
Message-ID: <199702180549.WAA02020@a202.wnmu.edu>
Rendered body type: text/plain

>
> >I purchased two FreeWave 915 MHz SS transceivers to evaluate under the
> >STA.
> >While they were not a bargain compared to the (failed) TAPR purchase,
> >they are still a very good deal in terms of performance for the dollar.
>
> Are we talking ~\$1300@ here ?
>
> Bob - wd6dod
>
>
Yes. sigh.

Fred

72. Re: [SS:1017] Re: I must be wrong ?

From: Phil Karn <karn@unix.ka9q.ampr.org>
Date: Tue, 18 Feb 1997 01:56:19 -0800 (PST)
To: ss@tapr.org
Message-ID: <199702180956.BAA09240@unix.ka9q.ampr.org>
Rendered body type: text/plain

> GPS satellites have a baseband data rate of 9600 baud. So, that's just like

No, GPS satellites have a baseband data rate of 50 bps for the navigation message. That yields a pretty healthy processing gain of

1023000 / 50 = 43.1 dB against uncorrelated interference.

Some of this processing gain is "used up" by multiple access interference from the other satellites in view. E.g., if you have 6 satellites in view at the same time and they're all arriving with equal strength (a simplifying assumption that isn't generally true) you lose $10 \cdot \log_{10}(6-1) \approx 7$ dB in SNR due to CDMA interference. But that still leaves you with a whopping 36.1 dB SNR, ignoring thermal noise.

Still, this probably explains why so many cheap GPS receivers can get away with multiplexing their channels instead of having true parallel channels.

Phil

73. Re: [SS:1026] Re: FreeWave

From: Neven Dilkov <neven@lucy.spct.net>
Date: Tue, 18 Feb 1997 17:18:15 +0100
To: ss@tapr.org
Message-ID: <1.5.4.16.19970218161815.0bbf728e@lucy.spct.net>
Rendered body type: text/plain

Fred, or someone else:

At 10:30 PM 2/17/97 -0600, you wrote:

>> >I purchased two FreeWave 915 MHz SS transceivers to evaluate under the
>> >STA.
>> >While they were not a bargain compared to the (failed) TAPR purchase,
>> >they are still a very good deal in terms of performance for the dollar.
>>

How difficult is to get the output of the FreeWave transceiver and convert it to the 2.4GHz band?

The 900Mhz is licensed here in Bulgaria and I can't use it.. The other commercial products working at 2.4GHz are prohibitively expensive for me.

Any info would be greatly appreciated...

Neven & Vesco (LZ3CQ)

74. Re: [SS:1028] Re: FreeWave

From: Fred Treasure <fred@astro.wnmu.edu>
Date: Tue, 18 Feb 1997 12:22:16 -0700 (MST)
To: ss@tapr.org
Message-ID: <199702181922.MAA04565@a202.wnmu.edu>
Rendered body type: text/plain

>
> How difficult is to get the output of the FreeWave transceiver and convert
> it to the 2.4GHz band?
> The 900Mhz is licensed here in Bulgaria and I can't use it.. The other
> commercial products working at 2.4GHz are prohibitively expensive for me.

Hello Neven and Vesco,

I don't think that would work. Other spread spectrum devices such as WaveLAN cards that have versions for 2.4 GHz might be a better choice. If you need a good source of information take a look at

<http://hydra/carleton.ca/info/wlan.html>

Speaking of expensive, the FreeWave transceivers are \$1300 each. A WaveLAN 2.4 GHz channel B card for use outside of the U.S.A. is \$795.

Take a look at the http site and see if anything there meets your needs. My experience has been with FreeWave, Wavelan and Proxim 915 MHz units. I don't have any practical knowledge about the 2.4 GHz devices.

Thank you for taking the time to write and let me know if I can be of further assistance.

Best Regards,

Fred

75. Spread Spectrum Design

From: "James A Vincent" <javincent@iee.org>
Date: Tue, 18 Feb 1997 20:29:21 0000
To: ss@tapr.org
Message-ID: <9702182031.AA19452@gate.rmcs.cranfield.ac.uk>
Rendered body type: text/plain

I have been following the discussion on the TAPR bulk purchase of Freewave SS modules. I feel that the withdrawal of the offer to supply these units to TAPR should be viewed positively, as it should hopefully encourage interested amateurs to focus on non-proprietary SS designs .

A few years ago, I designed and built a 1W direct sequence transmitter and receiver which operated at 435 MHz with BPSK modulation (8 MHz mainlobe bandwidth) and 32 kBits/s delta-modulated voice. A companion receiver utilised a delay locked loop to recover the SS signal. I decided that the best design approach was to use standard components which were readily available (as far as possible with rf components !) and use a modular approach to the design.

This resulted in a system which could be readily modified and permit experimentation with different architectures as my knowledge of SS increased and new devices became available.

The system was not "state-of-the-art" and consisted of many die-cast boxes rather than a single PCMCIA card. However, the components were relatively easy to find and experimentation was possible as all sub-system modules could be modified (unlike commercial implementations). This design was published in the UK journal Electronics and Wireless World (Voice Link over Spread Spectrum Radio, James Vincent, September and October 1993) and in Randy Robert's Spread Spectrum Scene Magazine (see www.sss-mag.com).

I would like to propose that the SIG should focus their skills into producing a modular SS system (either ds, fh or even a hybrid) using standard digital "glue" logic components (e.g. HC/AC TTL logic families) and common rf components such as (for example) the Philips/Sigmetics NE605 series and Mini-Circuits mixers and MAR mmics.

I feel that such an approach would allow individuals to more easily understand SS concepts and circuits whilst promoting flexibility in SS system design and allow an amateur standard(s) to evolve. I fear that the adoption of a US commercial standard (using specific US FCC frequency allocations and proprietary architectures) would stifle rf experimentation and make it extremely difficult for amateur SS techniques to be adopted internationally.

James Vincent G1PVZ

76. Re: [SS:1030] Spread Spectrum Design

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Tue, 18 Feb 1997 17:26:21 -0500
To: ss@tapr.org
Message-ID: <199702182226.RAA06559@Paris.GASD102designcenter>
Rendered body type: text/plain

> This design was published in the UK
> journal Electronics and Wireless World (Voice Link over Spread
> Spectrum Radio, James Vincent, September and October 1993) and in
> Randy Robert's Spread Spectrum Scene Magazine (see
> www.sss-mag.com).

>
> I would like to propose that the SIG should focus their skills
> into producing a modular SS system (either ds, fh or even a
> hybrid) using standard digital "glue" logic components (e.g.
> HC/AC TTL logic families) and common rf components such as (for
> example) the Philips/Sigmetics NE605 series and Mini-Circuits
> mixers and MAR mmics.

>
> I feel that such an approach would allow individuals to more
> easily understand SS concepts and circuits whilst promoting
> flexibility in SS system design and allow an amateur standard(s)
> to evolve. I fear that the adoption of a US commercial standard
> (using specific US FCC frequency allocations and proprietary
> architectures) would stifle rf experimentation and make it
> extremely difficult for amateur SS techniques to be adopted

> internationally.
>
> James Vincent G1PVZ
>

I have been thinking about the best possible route for this SS project. I have to agree with James. His modular approach is the same thing I was discussing last week. His article was pretty informative. I learned about using 3-db pad attenuators in RF circuit design, something that some hams don't think twice about.

As to the PRISM chipset (or any chipset) approach, the frequencies involved would cause more headaches than its worth, at least right now. Since we only have 6 months, we don't have time to fret over such matters. And why should we use a chipset only to turn around and develop something else from scratch?

James' proposal brings up another point that we have been discussing: which frequency(ies) to use. This is certain to open a can of worms, especially with the repeater guys, weak signal, etc.

I think the best thing to do is use a top-down, modular, block format: have an rf section, which can drop into the system and use whatever frequency(ies) you want; a mod/demod section, preferably using a DSP or programmable logic; an FEC section; and a interface section, using RS232/RS422 and audio outputs/inputs.

One thing TAPR could do is develop a set of standards for amateur SS experimentation: how to spread/despread, how much bandwidth to use in certain frequency bands, post source code for the DSP, etc. I believe that the modular approach, with guidance from TAPR, is the best experimental approach we can make.

Anyone like to comment?

Tony KE4ATO

77. Einstein on Radio

From: Steve Sampson <ssampson@claven.tinker.af.mil>
Date: Wed, 19 Feb 1997 08:54:17 -0600
To: ss@tapr.org
Message-ID: <330B1419.41C6@eds.tinker.af.mil>
Rendered body type: text/plain

Thought for the day:

Einstein on Radio

Albert Einstein's explanation of radio:

"The telegraph is like a very very very long cat. You pull its tail in New York and its head meows in Philidelphia, you understand this? Radio works exactly the same except there is no cat."

78. LMR-400/LMR-600

From: Jeff King <jeff@mich.com>
Date: Wed, 19 Feb 1997 21:40:29 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970220024029.00741f3c@mail.mich.com>
Rendered body type: text/plain

Anyone know of anyone giving discounts on LMR-400 or LMR-600?

Thanks

-Jeff

79. Re: [SS:1024] FreeWave

From: Steve Gonsel <sgonsel@worldnet.att.net>
Date: Fri, 21 Feb 1997 14:30:29 +0000
To: ss@tapr.org
Message-ID: <19970221143027.AAA22794@LOCALNAME>
Rendered body type: text/plain

This is *WAY* out of my league, but I saw an interesting article in "Personal Engineering and Instrumentation News", February 1997, Vol 14 No. 2, pages 29 to 39, titled: "Technology, regs dictate multiple decisions for

wireless links". This is basically a review of commercially available products for Spread spectrum devices, both 900Mhz & 2.4GHz, with prices from %50 to ???, lists of suppliers, and a summary of FCC regs. The magazine has a web page <http://www.pein.com> with copies of articles available for viewing/downloading. I checked today (2/21/97,9:00am) and the January, 97 issue is the latest on line.

12:10 AM 2/18/97 +0000, you wrote:
>I purchased two FreeWave 915 MHz SS transceivers to evaluate under the STA.
>While they were not a bargain compared to the (failed) TAPR purchase, they

80. Re: Any TAPR Group Purchase

From: Doug Crompton <wa3dsp@marconi.crompton.com>
Date: Fri, 21 Feb 1997 10:40:24 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.91.970221103504.26064A-100000@marconi.crompton.com>
Rendered body type: text/plain

Sorry if this is a repeat topic but I have not been following.

I was attempting to purchase the TAPR offered SS Box. I have great difficulty getting into the TAPR phone system. That is talking to a real person and my messsge(s) left there are not returned. Forget if I tried email.

Anyhow - Is the buy dead? If so is there anything else planned?

73 Doug

```
*****
*   Doug Crompton           *
*   Richboro, PA 18954      *
*   215-355-5307            *
*                           *
*   doug@crompton.com       *
*   wa3dsp@wa3dsp.ampr.org  *
*   http://www.crompton.com *
*****
```

81. Re: Tapr SS Purchase

From: Doug Crompton <wa3dsp@marconi.crompton.com>
Date: Fri, 21 Feb 1997 13:49:55 -0500 (EST)
To: ss@tapr.org
Cc: Thomas Jim <thomas_jim@msah6.cig.mot.com>
Message-ID: <Pine.LNX.3.91.970221134459.27285A-100000@marconi.crompton.com>
Rendered body type: text/plain

On 21 Feb 1997, Thomas Jim wrote:

> It seems that the purchase agreement of Freewave RF modems was completely
> cancelled by Freewave. The discussions lately on the ss list has been mainly
> on what to do now instead. Primarily it has centered on trying to build a SS
> modularized setup. Some people had already purchased other SS gear such as
> WaveLAN PC cards and are already testing. I am more interested in using whats
> available myself, to do high speed packet linking, than trying to do design
> work. If they come up with an easy to build and cheap approach, I may try to
> build a pair for testing.
> 73 de Jim Thomas N9M00 (VP Chicago Area Packet Radio Association)
>
>

I agree, although I am willing to spend some money. I was going to buy two of the TAPR Freewave's.

Are there group (quantity) purchase prices for the Wavelan cards? What other options are there?

Doug

```
*****
*   Doug Crompton           *
*   Richboro, PA 18954      *
*   215-355-5307            *
*                           *
*   doug@crompton.com       *
*   wa3dsp@wa3dsp.ampr.org  *
*   http://www.crompton.com *
*****
```

82. Re: [SS:1013] Goals

From: RLANIER@mailb.harris.com (RLANIER)
Date: Fri, 21 Feb 1997 11:12:47 -0500
To: ss@tapr.org
Message-ID: <30df6920@mailb.harris.com>
Rendered body type: text/plain

>Permits spread spectrum emissions on amateur radio bands 50-54 MHz,
>144-148 MHz, 219-220 MHz and 222-225 MHz;

>Provides for transmission of hybrid spread spectrum emissions; and

>Permits the use of other spreading codes.

>With that said, I'll throw out a couple of suggestions. What about voice
>comms? No computer, protocol stacks, or arcane networking knowledge
>needed. Just a CODEC driving the unit and you are on your way. Technology
>might be easily cobbled from SS cordless phones. I really like the idea of
>a unit that puts out a nice IF like Robert's design. With transverters we
>could get up in many different bands and see who we affect. Might even be
>able to involve some of the weak signal guys who normally use transverters
>in their designs.

>Lee W. Fry AA0JP

I think Lee also favors doing a modular project. The transverters
could be designed by those who have more RF experience. This would
permit us to use the above mentioned frequency bands. Once we have a
good IF, it can be used for despread and then digitally processed. The
same is true for transmitting. A modular approach, using different
groups of people assigned to a task, would be possible.

Are we going to do it or not?

Tony KE4ATO

83. WaveLAN Product availability

From: "Robert A. Buaas" <buaas@wireless.net>
Date: Fri, 21 Feb 1997 13:25:28 -0800 (PST)
To: ss@tapr.org
Message-ID: <199702212125.NAA29602@wireless.net>
Rendered body type: text/plain

Doug (and Gang)--

I've been working on busting down the (price) door at Lucent (ex AT&T,
ex NCR), to get some decent prices for the WaveLAN products. I have not
succeeded terribly well, but at least the door is open.

I can provide 2.4 Gz ISA WaveLAN cards at \$599 each. I've also
opened a path for the WaveMODEM (the RF modem daughter module,
I believe, that sits on the WaveLAN ISA motherboard). These are
available at \$499 each. These are qty-1 prices, and if I can
get together a group purchase, there's a (remote) possibility
of getting a slightly lower price depending on the volume.

I don't have a firm price yet on 915 MHz ISA cards, but they are looking
like ~\$525 each.

This certainly is not the deal we had with the limited quantity
overstock/pullout's, unfortunately. Still, is there any interest?
If so, please email me direct, to minimize traffic on the list.
(buaas@wireless.net)

Details on the cards can be had at <http://www.wavelan.com>, and follow
the products thread. The WaveMODEM is a tricky gadget to program. I
was able to get the databook for it's 20-pin interface. It's 58-pages
(29 double-sided), and available only on paper. (I tried to get a .pdf,
but no luck. Still trying.) In addition to the usual modem control
signals, it requires a 3-wire bidirectional serial interface for
programming internal registers. If you have interest in using the
modem stand-alone, I suggest reading the source code for either
the Linux or FreeBSD driver to get a sense of the complexity.
This is NOT a simple gadget to program.

This gadget transmits at +15 dBm, received successfully at -80 dBm input.
Bob Myers Associates (Phoenix) sells some very nice 2'x3' parabolic

antennas (beamwidth 7.5-deg, ~23 dBd gain). Longest distance reported to date is 10-miles at full throughput.

best regards/bob K6KGS

84. CruiseLan

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Fri, 21 Feb 1997 17:39:36 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970221223936.0038ed40@mindspring.com>
Rendered body type: text/plain

Looking through my new MECI catalog I see Zenith "Cruiselan Antenna with board", part no ALN-1010-00 at \$299.95. This looks like it may be the Zenith version of the Rangelan at a good price.

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
<http://www.mindspring.com/~lfry/part15.htm>

85. Low cost CAD for RF/SS?

From: Julian Fields <fields@svpal.org>
Date: Fri, 21 Feb 1997 14:15:19 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.3.88.9702211350.A29639-0100000@svpal.svpal.org>
Rendered body type: text/plain

What do people use to simulate the RF section
of a rcvr/xmtr? Spice? other?

What is the common PCB layout tool for the person
on a budget? Orcad?

Are any of the University CAD tools for RF any good
or worth downloading?

FIELDS@SVPAL.ORG Home email account of Julian Fields.

86. Wavelan driver

From: Fred Kehler <clearbrook_technical@mindlink.bc.ca>
Date: Fri, 21 Feb 1997 16:59:11 -0800
To: ss@tapr.org
Message-ID: <199702220059.QAA02184@linux.clrtech.com.>
Rendered body type: text/plain

Hi all, the radio stats from the linux wavelan driver, in the
/proc/net/wavelan file seem to be in the range 0 - ff for signal level,
silence and quality,
does anyone have some info on how these are derived? ie are they calibrated
to anything or just relative values? I am seeing something like
signal level =cd
silence =c1
quality, bounces from 7f to ff..
this is for a 6 (10km) link with 11db antennas
also there is a variable being set in the driver from antenna type, i don't
remember the exact variable name..can anyone comment on that?

thanks

Fred Kehler (ve7ipb)
Clearbrook Technical Services Ltd. clearbrook_technical@mindlink.bc.ca.

87. SS Chip list

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Fri, 21 Feb 1997 17:59:29 -1000
To: ss@tapr.org
Message-ID: <Pine.GS0.3.93.970221175820.20317B-100000@uhunix4>
Rendered body type: text/plain

A short while back, I mentioned I was going to put together a web page
with pointers to SS chips that might be of interest to the list. The page
is now available from my home page at <http://www.pixi.com/~beltrani/> or
directly at <http://www.pixi.com/~beltrani/ss.html>

- Paul Beltrani, AH6NU

88. Wide Band Gain Antenna...

From: wb9mjn@wb9mjn.ampr.org
Date: Sat, 22 Feb 97 10:38:35 UTC
To: ss@tapr.org
Message-ID: <12883@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi All,

This is related to SS, but not specifically about SS. So, please excuse the variation from the list's primary interest, please, please, hi.

This week I finished up a 1270 Mhz , 8 dBd antenna, which covers the whole 1270 band with 1.6 or better VSWR. Please do not take this as a final spec, but a typical number. The final spec , could be better, but it may be worse.

This antenna fits in 12 by 9 inch enclosure similar to the Ham/LAN Panel 915 antennas.

If we multiply by 3, we end up with 36 by 18. Which would be the size of a 440 whole band antenna, with 2:1 or better VSWR. Yep, the whole band, with 8dBd! 420 to 450 Mhz. This is significantly better than colinear antenna bandwidths. Its is similar to multiple bay full wave loop antennas, but with out the reliability problems of corporate coaxial feeds.

Now, how does this effect SS? Welp, yagis, and colinears are the type of antennas used at user stations. A multiple bay full wave loop antenna, is a bit of a large expense. Additionally, this prototype can be operated in horizontal polarisation, with a azimuthal beamwidth of the order of 70 degrees. Multiple bay full wave loop antennas, can have the loops turned horizontal, but they loose the reflection off the mast. Thus requiring modification to add a reflector mast boom at each point of the mast where there is an element.

Horizontal, good F/B ratio, and gain, might be away to do SS on 440. It would attenuate most of the FM. And the F/B ratio could be put to good use keeping TV transmitters out of receivers. With the whole band for spreading, it would also keep the processing gain maximised, resulting in a minimum interference to other modes.

And, of course, on 1270, this antenna fills a gap. A small gain antenna, for SS users, covering the whole band. Most yagi s in this band have trouble covering the whole band. F9FT sells yagi s for the high side, and low side seperately. 60 Mhz, spread 56 KB is 28 dB processing gain.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

89. Re: [SS:1040] Low cost CAD for RF/SS?

From: marius@krepro.no (Marius Hauki)
Date: Mon, 24 Feb 1997 00:15:51 +0100 (MET)
To: ss@tapr.org
Message-ID: <199702232315.AAA19588@mail1.sn.no>
Rendered body type: text/plain

>

>What do people use to simulate the RF section
>of a rcvr/xmtr? Spice? other?

ARRL Radio Designer is fine for a lot of stuff.
If you need an unlinear simulator PSpice is
a very good solution. Check out : www.microsim.com and
get a free avaluation CD-ROM with full doc. that
really works !

>What is the common PCB layout tool for the person
>on a budget? Orcad?

OrCAD sells an excellent tool for RF layouts :

OrCAD Layout LTD. This package is reasonably priced and has a very good component library. In the LTD version there are no limits on component count or layers. The package is delivered without an autorouter, but you do not need one for RF work.

For schematic capture I highly recommend OrCAD Capture. It is very powerful, and easy to use and learn.

All OrCAD Windows products support 3.11, 95 and NT. Check out www.orcad.com for more info !

73
Marius Hauki
LA9EEA

>
>Are any of the University CAD tools for RF any good
>or worth downloading?
>
>FIELDS@SVPAL.ORG Home email account of Julian Fields.
>
>
>

90. Re: [SS:1044] Re: Low cost CAD for RF/SS?

From: Lyle Johnson <lylej@azstarnet.com>
Date: Sun, 23 Feb 1997 18:41:31 -0700
To: ss@tapr.org
Message-ID: <3.0.32.19970223183742.0071307c@pop.azstarnet.com>
Rendered body type: text/plain

>>What is the common PCB layout tool for the person
>>on a budget? Orcad?

In addition to OrCAD, you might take a look at www.ivex.com. IVex makes low cost windows-based tools that are quite cheap. The freeware evaluation version will give you a feel for what they can do. For \$495 they are "unlimited" in size of projects. They also have other price points (\$29.95 gets you enough capability for many simpler projects, 500 or so "connections").

For microstrip lines and the like, PUFF is available from the University of California for about \$20.

Protel also has a DOS-based PCB program called Easytrax (DOS). It is freeware and unsupported. I can't comment on how good or bad it is, but the price is right.

I own no stock in any of these companies :-)

Cheers,

Lyle

91. Re: [SS:1045] Re: Low cost CAD for RF/SS?

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Sun, 23 Feb 1997 17:08:29 -1000
To: ss@tapr.org
Message-ID: <Pine.GS0.3.93.970223170512.11720A-100000@uhunix4>
Rendered body type: text/plain

On Sun, 23 Feb 1997, Lyle Johnson wrote:

>
> Protel also has a DOS-based PCB program called Easytrax (DOS). It is
> freeware and unsupported. I can't comment on how good or bad it is, but
> the price is right.
>

I use Easytrax and am very happy with it. Before you purchase anything I strongly recommend you take a look at it. It is available on the net, check out one of the SimTel mirrors or Walnut Creek CD-ROM.

- Paul Beltrani

92. Re: [SS:1046] Re: Low cost CAD for RF/SS?

From: Lyle Johnson <lylej@azstarnet.com>
Date: Sun, 23 Feb 1997 21:20:18 -0700
To: ss@tapr.org
Message-ID: <3.0.32.19970223212002.00716b74@pop.azstarnet.com>
Rendered body type: text/plain

It's also located at www.protel.com for free download...

Cheers,

Lyle

At 09:10 PM 2/23/97 -0600, you wrote:
>
>
>On Sun, 23 Feb 1997, Lyle Johnson wrote:
>
>>
>> Protel also has a DOS-based PCB program called Easytrax (DOS). It is
>> freeware and unsupported. I can't comment on how good or bad it is, but
>> the price is right.
>>
>
>I use Easytrax and am very happy with it. Before you purchase anything I
>strongly recommend you take a look at it. It is available on the net,
>check out one of the SimTel mirrors or Walnut Creek CD-ROM.
>
> - Paul Beltrani
>
>

93. Re: [SS:1045] Re: Low cost CAD for RF/SS?

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Mon, 24 Feb 1997 17:05:06 -0600 (CST)
To: Lyle Johnson <lylej@azstarnet.com>
Cc: ss@tapr.org
Message-ID: <Pine.BSF.3.91.970224170326.13107B-100000@tekdata.com>
Rendered body type: text/plain

On Sun, 23 Feb 1997, Lyle Johnson wrote:

> >>What is the common PCB layout tool for the person
> >>on a budget? Orcad?
>
> In addition to OrCAD, you might take a look at www.ivex.com. IVex makes
> low cost windows-based tools that are quite cheap. The freeware evaluation
> version will give you a feel for what they can do. For \$495 they are
> "unlimited" in size of projects. They also have other price points (\$29.95
> gets you enough capability for many simpler projects, 500 or so "connections").
>
> For microstrip lines and the like, PUFF is available from the University of
> California for about \$20.

I've heard of PUFF before and I am interested in it. Can someone tell me more about exactly where to get it?

It can design microstrip filters, and the like, right?

Fred M. Spinner. KA9VAW
fred@tekdata.com

94. Re: [SS:1048] Re: Low cost CAD for RF/SS?

From: Lyle Johnson <lylej@azstarnet.com>
Date: Mon, 24 Feb 1997 20:13:37 -0700
To: ss@tapr.org
Message-ID: <3.0.32.19970224201305.00713200@pop.azstarnet.com>
Rendered body type: text/plain

Fred,

>I've heard of PUFF before and I am interested in it. Can someone tell
>me more about exactly where to get it?
>
>It can design microstrip filters, and the like, right?

See "<http://www.systems.caltech.edu/EE/Faculty/rutledge/puff.html>" for information, how to order, what it does, etc. Costs \$10.

>From the manual, "PUFF is a scattering parameter and layout calculator for microwave circuits." You use it to design and verify the board microstrip

lines, etc. Then you do the actual PCB layout in soem other program. Puff plots graphics, but PC houses want Gerber, and no one actually shoots film from a plot these days :-)

Enjoy!

Lyle

95. Harris Intros PRISM Kit

From: wd5ivd@tapr.org
Date: Wed, 26 Feb 1997 11:40:54 -0600
To: " Spread Spectrum "<ss@tapr.org>
Message-ID: <v0302075eaf3a25d7f5ee@[208.134.134.40]>
Rendered body type: text/plain

I just got sent this. Cheers - Greg

Harris Intros PRISM Kit

Source: Electronic Buyers' News

Electronic Buyers' News via Individual Inc. : Fremont, Calif. - Harris Corp. has introduced a reference design kit for its PRISM direct-sequence spread-spectrum (DSSS) wireless LAN transceiver chip set.

The kit is intended to give OEM designers tools to concurrently develop device drivers, applications software, and hardware for IEEE 802.11-compliant products. The idea is to slash development time for a range of wireless products, according to Chris Henningsen, director of the Melbourne, Fla., chip maker's wireless, video, and multimedia marketing.

Harris, which launched its four-chip PRISM chip set in late 1995, sees a major opportunity in the spread-spectrum business. Henningsen cited research from Integrated Circuit Engineering Corp., Scottsdale, Ariz., predicting that the wireless LAN market will increase from \$745 million this year to \$1.9 billion five years from now.

The reference design kit, called the WLANKITPRI-EVAL, gives OEM-designed hardware and software the capability of implementing a 2-Mbit/s DSSS wireless LAN in the 2.4-GHz Industrial-Scientific-Medical band. About 18 months after its launch, the PRISM chip set remains the industry's only prepackaged DSSS solution, according to a Harris spokesman.

The evaluation kit includes two FCC-approved Type 2 PC Card wireless LAN cards with integral antennas, as well as driver and media-access-controller software and a pair of single-user licenses. The kit offers Windows-compatible diagnostic software for measurement and display of packet error rate and throughput.

The PRISM DSSS chip set was a gamble for Harris, according to Henningsen. Development costs were high, and the market has been slower to take off than expected, he said. But the wireless LAN market can look forward to compound average annual growth of more than 100% through 1999, according to Dataquest Inc., San Jose. In Harris' past fiscal year, sales of the chip set reached \$36 million, and the company expects \$100 million in orders by 1998.

The WLANKITPRI-EVAL design kit is available for \$995.

96. Hedy Lamarr Gets Her Due -- As a Wireless-Broadcast Pioneer

From: wd5ivd@tapr.org
Date: Wed, 26 Feb 1997 13:15:45 -0600
To: " Spread Spectrum "<ss@tapr.org>
Cc: "Steven N7HPR Bible"<n7hpr@tapr.org>
Message-ID: <v0302076faf3a3c2835e6@[208.134.134.40]>
Rendered body type: text/plain

I had this sent to me and thought that many of you would like to see it.

Cheers - Greg

The Wall Street Journal Interactive Edition -- February 19, 1997

Hedy Lamarr Gets Her Due --
As a Wireless-Broadcast Pioneer

By MARK BOSLET
Dow Jones News Services

PALO ALTO, Calif. -- Hollywood promoted her as the "most beautiful girl in the world," but some electrical engineers think of Hedy Lamarr as more than just a pretty face.

The Austrian actress, whose career hit its zenith in the 1940s, patented a wireless broadcast technology that has suddenly caught the interest and imagination of today's engineering community.

While some scientists readily point to Ms. Lamarr's 1942 patent as the foundation for spread-spectrum technology -- she received the patent with composer George Antheil -- few in the wireless-communication industry know of the screen star's contribution.

Ms. Lamarr is a "huge part of the history of this industry," said Proxim Inc. Chief Executive David C. King, whose company first introduced a circuit board using spread-spectrum technology in 1989 and now has hundreds of products based on it.

Qualcomm Inc. Vice Chairman Andrew J. Viterbi is equally complimentary. Qualcomm's cellular phones use a form of spread spectrum that differs somewhat from the Lamarr and Antheil concept. However, in many other applications of spread spectrum, the "fundamental concept is the same" today, Mr. Viterbi said.

The patent granted to Ms. Lamarr and Mr. Antheil, who had no technical training in electronics, outlined a procedure for shielding radio-controlled torpedoes from German signal jamming in World War II. The technique called for the use of devices similar to player-piano rolls installed shipboard and inside the torpedoes. Mr. Antheil, who was considered the "bad boy" of music in his day for his iconoclastic compositions that called for musical performances by machines, had synchronized two piano rolls for an adaptation of his 1923 Ballet Mechanic and drew on that work for the shielding concept.

The idea was simple: use the piano rolls to skip from one frequency to the next in random order, much as a piano performance moves from one note to the next. The enemy does not know which frequency will come up next.

This concept came to be called frequency hopping and was turned over to the military during the war. But it did not make its debut until the Cuban Missile Crisis, when it was used for radio communications. It led to the modern-day notion of spread spectrum: the spreading of a signal among many frequencies to prevent interference, eavesdropping or jamming. Proponents also cite it as a way for numerous users to share the airwaves.

At first, coming up with sophisticated systems to synchronize two or more transmitters proved a costly hurdle. However, with advances in semiconductor technology, and the increased power of low-cost digital signal processors, spread spectrum stepped from a technology used by deep-pocketed operations such as the military into much wider use. Commercial products began coming to market in the 1980s.

It is now used in cordless and cellular phones, in alarm systems and military radios, in global-positioning system satellites and in linking portable and desktop computers wirelessly to corporate networks.

Ms. Lamarr's interest in a device to protect torpedoes stemmed from a failed marriage to Austrian munitions magnate Fritz Mandl, a maker of bombs, bullets and torpedoes for Hitler's war machine.

Mr. Mandl would often have fellow weapons builders over for dinner, and when Ms. Lamarr fled Austria and an overly possessive Mr. Mandl in advance of World War II, she took her memories of all this talk of "rockets and radios" with her, said Anthony Loder, Ms. Lamarr's son.

The most recent round of enthusiasm for spread spectrum has roots in last month's Federal Communications Commission decision to set aside

more frequencies for spread spectrum, allowing for more-powerful broadcasts.

Companies now see the technology bringing telephone, television and computer-data transmissions to neighborhoods or remote villages using a single nearby antenna, eliminating the high cost of having to string out wires.

"I see an incredible market," said Dan Maxwell, vice president of World Wireless Communications Inc., adding that interest in the technology has "gone bonkers."

The cost savings are potentially huge, a consideration especially important in emerging countries where investment capital may be scarce, said David R. Hughes, who helped put together a Lamarr home page on the Web. Mr. Hughes envisions the technology providing an inexpensive way for schools to link themselves to one another and to the Internet, especially in remote communities.

Ms. Lamarr, now 83 and her image sullied by two shoplifting arrests and a reputation for being difficult, has become a recluse living in Altamonte, Fla. She apparently turned down an award for her patent because it meant appearing before Congress.

Mr. Hughes believes it is time for Ms. Lamarr to receive recognition for her work. He has proposed she receive an award from the Electronic Frontier Foundation, a group addressing Internet-privacy issues, and notes that she wouldn't have to attend the presentation.

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97. Re: [SS:1051] Hedy Lamarr Gets Her Due -- As a Wireless-Broadcast Pioneer

From: Larry Bush <lbush@eramp.net>
Date: Wed, 26 Feb 1997 16:09:10 -0600
To: ss@tapr.org
Message-ID: <2.2.32.19970226220910.006d4f28@eramp.net>
Rendered body type: text/plain

At 01:31 PM 2/26/97 -0600, you wrote:
>I had this sent to me and thought that many of you would like to see it.
>
>Cheers - Greg
>
>-----
>
>The Wall Street Journal Interactive Edition -- February 19, 1997
>
>
>Hedy Lamarr Gets Her Due --
>As a Wireless-Broadcast Pioneer
>

FYI

The magazine, American Heritage of Invention & Technology, Volume 12/Number 4, has Hedy Lamarr on front cover and story includes copies of original patent.

73...
Larry Bush, W5NCD
359 Arrowhead Point
Waco, Texas 76712
phone 817-848-5155
Fax # 817-299-1040

98. Re: [SS:1050] Harris Intros PRISM Kit

From: Jeff King <jeff@mich.com>
Date: Wed, 26 Feb 1997 17:59:28 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970226225928.0071fa30@mail.mich.com>
Rendered body type: text/plain

Greg:

Harris also has another eval kit with SMA connectors and PCMCIA extenders included. Its \$1395 and recommended for hardware developers.

They (Harris) will shortly be introducing a ISA based development kit as well.

-Jeff wb8wka

At 11:50 AM 2/26/97 -0600, wd5ivd@tapr.org wrote:

>I just got sent this. Cheers - Greg

>

>-----

>

>Harris Intros PRISM Kit

>

Clip

>The reference design kit, called the WLANKITPRI-EVAL, gives OEM-designed

>hardware and software the capability of implementing a 2-Mbit/s DSSS

>wireless LAN in the 2.4-GHz Industrial-Scientific-Medical band.

Clip

>

>The evaluation kit includes two FCC-approved Type 2 PC Card wireless LAN

>cards with integral antennas, as well as driver and

>

Clip

>The WLANKITPRI-EVAL design kit is available for \$995.

>

March 1997

Original source file: ss.9703

Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9703

1. SS Design

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Mon, 3 Mar 1997 08:51:42 -0500
To: ss@tapr.org
Message-ID: <199703031351.IAA21172@Muskegon.com.gasd102>
Rendered body type: text/plain

Am I the only person who wants to do a group SS design? Since I don't live near TAPR (or any other high-tech group), this is the only why I can participate. I assumed that there would be a discussion over the weekend, but nothing.

Does anyone still want to do this?

Tony KE4AT0

2. Spread Spectrum Rule Change NPRM release by FCC

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Mon, 3 Mar 1997 08:25:44 -0800
To: ss@tapr.org, ss-sta@tapr.org
Message-ID: <v03101951af40abba4314@[204.118.182.22]>
Rendered body type: text/plain

Today the FCC released the NPRM for the Spread Spectrum Rule changes to Part 97:

IN THE MATTER OF AMENDMENT OF THE AMATEUR SERVICE RULES TO PROVIDE FOR GREATER USE OF SPREAD SPECTRUM COMMUNICATION TECHNOLOGIES. Proposed to amend amateur rules to authorize amateur stations to make greater use of SS type emission technologies. Dkt No.: WT- 97-12. Action by the Commission. Adopted: January 9, 1997. by NPRM. (FCC No. 97-10). WTB

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com  
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM  
Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>  
Fax: (510) 770-9854 !  
~~~~~

3. Re: [SS:1054] SS Design

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Mon, 3 Mar 1997 18:10:30 -1000
To: ss@tapr.org
Message-ID: <Pine.GS0.3.93.970303175600.18154A-100000@uhunix4>
Rendered body type: text/plain

On Mon, 3 Mar 1997, Tony Lanier wrote:

> Am I the only person who wants to do a group SS design? Since
> I don't live near TAPR (or any other high-tech group), this
> is the only why I can participate. I assumed that there would
> be a discussion over the weekend, but nothing.
>
> Does anyone still want to do this?

I am interested in building something to meet the following design goals (in no particular order):

- 1) User application independent.
- 2) Band independent
- 3) Programmable to allow for experimentation
- 4) Short development time so we can take advantage of the STA
- 5) Reasonable cost

(The next 8 lines need to be viewed with a fixed width font)
Something like the "SS Box" in this diagram:

[App Box]<-Data I/O->[SS Box]<-IF I/O->[Transverter]->Ant Out
 ^ ^

```

      |
RS232 Programming Port  +-----<Ant In
      |
      v

```

The Zilog Z87200 / Stanford Telecom STELL-200A chip may be a good starting point.

- 1) Randy Roberts, KC6YJY has already made a proposal that includes a relatively complete design based on this chip.
- 2) Zilog makes an eval board that meets goals 1-4. I am still waiting for a price quote.
- 3) Stanford Telecom makes a similar (identical?) eval board, but the cost is prohibitive. \$1500 / unit, \$750 for the optional interface board.

Links to the above 3 items as well as other chips that may be of interest to the list are available at <http://www.pixi.com/~beltrani/ss.html>. The link to Spread Spectrum Scene Online leads to Mr. Roberts design/proposal.

I expect the Zilog eval board will be similar in price the the S Tel product. Perhaps Mr. Roberts can give us an idea of what the cost per unit would be for his design?

- Paul Beltrani, AH6NU

4. Ground-Up Spread Spectrum

From: Matt Ettus <mne@cmu.edu>
 Date: Tue, 04 Mar 1997 14:09:26 -0500
 To: ss@tapr.org
 Message-ID: <1.5.4.32.19970304190926.00663da0@gauss.ece.cmu.edu>
 Rendered body type: text/plain

On the subject of designing our own SS system

I think that designing our own is the only way to go. Relying on eval boardas or cutting apart other designs is expensive and destined to be reliant on their technology.

This past summer, I designed a 900MHz SS modem for a commercial application. It could be built on a 5x7 PCB, and was not layout critical except for the RF section. Total cost was about \$100 in production (~1000) quantity. There is no reason we couldn't do something similar with all of the RF ICs and SS ICs currently available.

I would suggest that anyone interested look at the Cylink home page (I think its www.cylink.com, but check Yahoo). They make about 6 different chips for doing DS SS at bit rates of 1200 to 2Mbit/s, with chip rates up to 32 per bit. The chips also start for very low prices (\$12 for the slow ones), and handle most of the SS stuff. They can be programmed by a simple microcontroller (we used a 68HC05).

73
 Matt Ettus
 N2MJI

5. News on SS NPRM

From: Dewayne Hendricks <dewayne@warpspeed.com>
 Date: Tue, 4 Mar 1997 11:17:46 -0800
 To: ss@tapr.org, ss-sta@tapr.org
 Message-ID: <v03101905af422359daea@[204.118.182.22]>
 Rendered body type: text/plain

The FCC released the long awaited NPRM on "Amendement of the Amateur Service Rules to Provide For Greater Use of Spread Spectrum Communication Technologies", FCC 97-10 yesterday.

If the FCC doesn't post the NPRM up on their website in the next serveral days, then TAPR will see that its posted on our website. The last time I checked this morning, it still wasn't available from the FCC website.

If you're interested in just what the rule changes the FCC is proposing to Part 97 for spread spectrum, they are word for word the same language that the ARRL proposed in their petition, RM-8737 (available on the TAPR website). Comments are due on May 5, 1997 and reply comments are due June 5, 1997.

-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com  
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM  
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>  
Fax: (510) 770-9854 !  
~~~~~

6. Re: [SS:1056] Re: SS Design

From: wb9mjn@wb9mjn.ampr.org
Date: Tue, 04 Mar 97 13:26:18 UTC
To: ss@tapr.org
Message-ID: <12948@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Paul,

I have some comments on ur lineup. What u have proposed is somewhat expensive.

If the data i/o and control i/o were done virtually over a Ethernet port, the hardware costs would be allot less there, and the programing would be about the same, hopefully.

I would not use a Transverter. They are very expensive. The SS box should do analog I/Q to a "Data Radio". Optional parallel and/or one wire serial I/Q would be nice too. Some Data Radio line ups want one wire data, and internally they split it out into parallel, before aplying it to a D/A. SO, maybe a better solution would be analog/one wire digital I/Q, switch selectable, with an optional external parrallel Data I/Q converter.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

7. Re: [SS:1059] Re: SS Design

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Tue, 4 Mar 1997 15:50:50 -1000
To: ss@tapr.org
Message-ID: <Pine.GS0.3.93.970304154402.19662C-100000@uhunix4>
Rendered body type: text/plain

On Tue, 4 Mar 1997 wb9mjn@wb9mjn.ampr.org wrote:

> I have some comments on ur lineup. What u have proposed is somewhat
> expensive.
Thanks for the feedback.

> If the data i/o and control i/o were done virtually over a Ethernet
> port, the hardware costs would be allot less there, and the programing would
> be about the same, hopefully.

- 1) I disagree on the expense. I think a simple RS232 interface much would be much cheaper to design/implement than developing an Ethernet interface.
- 2) Ethernet implies a PC or network interface. This confilicts with goal #1 Not everyone is interested in data networks. Some may want to use this device for voice communications. For those who are into networks, it would be a simpler matter to use existing software and connect this to a serial port or PI card. The truely hardcore could develop an ethernet or isa interface.

>
> I would not use a Transverter. They are very expensive. The SS box should
> do analog I/Q to a "Data Radio". Optional parallel and/or one wire serial
> ...

Works for me. My point in the diagram was to show modularity and band independence. A "data radio" interface instead of an IF would be fine.

- Paul, AH6NU

8. Spread Spectrum Talk

From: Dino Darling <dinod@deltanet.com>
 Date: Wed, 05 Mar 1997 00:27:54 -0800
 To: ss@tapr.org
 Message-ID: <1.5.4.32.19970305082754.00680a40@mail.deltanet.com>
 Rendered body type: text/plain

>X-From_: scdcc-owner@smartlink.net Tue Mar 4 19:45 PST 1997
 >From: schermer@ix.netcom.com
 >Date: Tue, 4 Mar 1997 21:43:40 -0600 (CST)
 >To: scdcc@smartlink.net
 >Cc: buass@wireless.net
 >Subject: Spread Spectrum Talk
 >Sender: owner-SCDCC@smartlink.net
 >Reply-To: SCDCC@smartlink.net
 >Content-Length: 606
 >
 >Announcement Announcement Announcement
 >
 >
 >
 >The SCDCC will be sponsoring a discussion by Robert A.. Buaas, K6KGS,
 >on Spread Spectrum Digital communication. The talk will be held at Jun's
 >Electronics on Sat March 22, 1997 10:30 AM. He will discuss the theory
 >behind spread spectrum, its benefits, and its implications on frequency utilization.
 >K6KGS has held a STA from the FCC for over five years. He is also working under
 >TAPR STA.. More details of the talk will be given in future announcements.
 >All are invited to attend. Further details will follow.
 >
 >73,
 >Bob, kk6rd
 >Chairman SCDCC
 >
 >
 >
 >
 >
 >
 Dino...dinod@deltanet.com

9. Re: [SS:1060] Re: SS Design

From: wb9mjn@wb9mjn.ampr.org
 Date: Wed, 05 Mar 97 01:52:09 UTC
 To: ss@tapr.org
 Message-ID: <12959@wb9mjn.ampr.org>
 Rendered body type: text/plain

Hi Paul,

Really don't see how a RS-232 port makes things easier for Voice communication. For Voice, some sorta in-box manually operated controls is the ideal. And these controls are much more expensive to develop than either the ethernet, or RS-232.

The ethernet is cheaper, since both functions can be rolled into one port. Rather than having the cost of two ports, and the software development to handle both ports simultaneously, flawlessly. It would be a higher up front thing, but rolled into many units, there should be a payback.

Altho, this idea might work with a parallel port as well. As has been done in some of the European packet networking hardware. A bidirectional parallel port would have enuf capacity for control and moderate data rates. Somebody should double check me on that statement, tho!

The thing is, that RS-232 seems cheap, but RS-232 is not really going to do the job above a couple hundred KB/s, in a standard computer. Then u need the PI-card, and the higher performance differential drivers. So, is there really a savings with RS-232 ? Or is it just a path to shifting the bucks into a PC interface card that is of limited production?

By using a ethernet card, even if its a dedicated one for the interface to the SS box, there is production volume that brings the PC side of things down.

On voice, one might dispense with real time control altogether, and have a prom to set spreading, hopping, and center frequency. And just connect a microphone to it. □□□□

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA

10. Re: [SS:1062] Re: SS Design

From: Phil Karn <karn@laptop.ka9q.ampr.org>
Date: Wed, 5 Mar 1997 02:13:05 -0800 (PST)
To: ss@tapr.org
Message-ID: <m0w2Dh3-000RxcC@laptop.ka9q.ampr.org>
Rendered body type: text/plain

I also argue for Ethernet. It's the "rs-232 of the '90s". The interfaces (chips and complete boards) are now universally available very cheap, the chips are much easier to talk to (especially since just about every operating system comes with built-in drivers) and of course it's far faster than RS-232. 10BaseT can be used in a simple 4-wire point-to-point mode, or with a hub it can handle many party-lined devices. Easier to transmit around the house too, given that 10Base T is already differentially encoded, while RS-232 is not.

I'm continually amazed at how many people keep trying to turn RS-232 into something like Ethernet (only much slower) to "save money", just as they keep trying to turn NOS into UNIX now that Linux is around...

Phil

11. Re: [SS:1063] Re: SS Design

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Wed, 5 Mar 1997 10:26:04 -1000
To: ss@tapr.org
Message-ID: <Pine.GS0.3.93.970305101955.17013A-100000@uhunix4>
Rendered body type: text/plain

On Wed, 5 Mar 1997, Phil Karn wrote:

> I also argue for Ethernet. It's the "rs-232 of the '90s". The
> interfaces (chips and complete boards) are now universally available
> very cheap, the chips are much easier to talk to (especially since
> ...
> I'm continually amazed at how many people keep trying to turn RS-232
> into something like Ethernet (only much slower) to "save money", just
> as they keep trying to turn NOS into UNIX now that Linux is around...

Personally, I like Ethernet. I use it to network my Win95, SolarisX86 and Linux machines at home. However I suggested RS-232/RS422 to meet the "User application independent" design goal. Not everyone is into data networks.

- Paul

12. Re: [SS:1062] Re: SS Design

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Wed, 5 Mar 1997 10:33:30 -1000
To: ss@tapr.org
Message-ID: <Pine.GS0.3.93.970305102620.17013B-100000@uhunix4>
Rendered body type: text/plain

On Tue, 4 Mar 1997 wb9mjn@wb9mjn.ampr.org wrote:

> Really don't see how a RS-232 port makes things easier for Voice com-
> munication. For Voice, some sorta in-box manually operated controls is the
> ideal. And these controls are much more expensive to develop than either
> the ethernet, or RS-232.

Quick example

Microphone --> CoDec chip --> serial data out --> SS Box
Speaker <-- Audio Amp <-- CoDec chip <-- serial data in <-- SS Box

Simple and cheap. My guess is << \$50 for the Audio/Codec stuff.

> The ethernet is cheaper, since both functions can be rolled into one
> port. Rather than having the cost of two ports, and the software development
> to handle both ports simultaneously, flawlessly. It would be a higher up
> front thing, but rolled into many units, there should be a payback.

You may be correct at an economy of scale level, but I am not sure there is even enough interest to make developing a prototype worthwhile. (Other than for the fun of it) Also, what I was suggesting does not require simultaneous control of two ports. In fact, it does not even require two

ports. (See below)

```
> ...
> The thing is, that RS-232 seems cheap, but RS-232 is not really going to
> do the job above a couple hundred KB/s, in a standard computer. Then u need
> the PI-card, and the higher performance differential drivers. So, is there
> really a savings with RS-232 ? Or is it just a path to shifting the bucks
> into a PC interface card that is of limited production?
> ...
```

You are correct. Let me respond to those points.

1) RS-232 IS speed limited. However an RS-422 interface for the data side will allow a chip like the Zilog Z8700 to operate at up to 2Mbps. We have not really talked about how fast we would expect this SS Box to be. It is not much of a benefit to talk to the box at 10Mbps if it can not process the data that quickly.

2) True, you need a PI or similar interface to drive such an interface.

3) Yes, you would be shifting the cost of a "High Speed" interface outside the SS Box. However, I was more interested in developing a piece of hardware so people could begin experimenting with SS quickly. If you are a network person and want speed, you could begin by setting up a 1024Kbps RS-232 link and then work on developing a fast interface. It would be simple to include connections for the experimenter to bypass the RS-232/RS-422 interface.

```
> On voice, one might dispense with real time control altogether, and have
> a prom to set spreading, hopping, and center frequency. And just connect a
> microphone to it. □□□□
```

Based on your comment farther up about the need to "to handle both ports simultaneously, flawlessly." and this paragraph, I think we have a different idea about what I meant by a programming port. I am NOT suggesting real-time control of the the SS Box or real-time debugging. I was suggesting a way a way to preprogram parameters as you suggested and then let the device run. It was more of a conceptual block of the diagram. In fact, it may be reasonable to use only one I/O port and simply switch between "programming mode" and "run mode".

Personally, I like Ethernet. However I am trying to keep in mind that not everyone who is interested in SS is interested in data networks.

Is the rest of the list interested in this thread?

- Paul, AH6NU

13. FCC Releases WT Docket 97-12

```
From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Wed, 5 Mar 1997 14:38:07 -0600
To: "TAPR-BB list mailing" <tapr-bb@tapr.org>,
    "Spread Spectrum" <ss@tapr.org>
Message-ID: <v03007803af438913fdb7@208.134.134.40>
Rendered body type: text/plain
```

```
http://www.tapr.org/ss
and
ftp://ftp.tapr.org/tapr/ss
```

now contains a pdf version of FCC WT Docket No. 97-12.

WT Docket No. 97-12 Notice of Proposed Rule Making regarding Amendment of the Amateur Service Rules to Provide For Greater Use of Spread Spectrum Communications Technologies was released March 3rd, 1997.

3/5/97

14. ARLB012 FCC proposes changes in spread spectrum regs

```
From: wd5ivd@tapr.org
Date: Wed, 5 Mar 1997 15:02:58 -0600
To: "Spread Spectrum" <ss@tapr.org>,
    "TAPR-BB list mailing" <tapr-bb@tapr.org>
Message-ID: <v03007804af438fd694bd@208.134.134.40>
Rendered body type: text/plain
```

SB QST @ ARL \$ARLB012
ARLB012 FCC proposes changes in spread spectrum regs

ZCZC AG12
QST de W1AW
ARRL Bulletin 12 ARLB012
>From ARRL Headquarters
Newington CT March 5, 1997
To all radio amateurs

SB QST ARL ARLB012
ARLB012 FCC proposes changes in spread spectrum regs

Responding to a petition for rulemaking from the ARRL, the FCC has proposed in WT Docket 97-12 to adopt changes in its Amateur Service rules governing spread spectrum. In spread spectrum the energy of the transmitted signal is distributed among several synchronized frequencies within a band and reassembled at the receiving end. This reduces power density and duration of a transmission on a particular frequency and lets spread spectrum almost invisibly share the same spectrum with users of other, narrowband modes. Spread spectrum also provides for improved communication under poor signal-to-noise conditions and in selective fading and multipath environments, and the ability to accommodate more communication channels operating simultaneously in the same spectrum.

The League's December 1995 petition asked the FCC to relax its rules to give Amateur Radio more opportunities to contribute to the development of spread spectrum techniques. Specifically, the League sought to have the FCC relax restrictions on spreading sequences and asked for greater flexibility in spreading modulation. In response, the FCC now has proposed to drop rules restricting amateur stations to transmitting only frequency-hopping and direct-sequencing spreading techniques. As requested by the League, the FCC also has proposed to require automatic power control for spread spectrum transmitters, to ensure use of the minimum power level needed to carry out communication.

The FCC also went along with the League's request to permit brief test transmissions using spread spectrum and to allow international spread spectrum communications between amateurs in the US and those in countries that allow hams to use spread spectrum. The current rules allow only domestic communication.

The use of spread spectrum techniques was first approved for Amateur Radio in 1985 for bands above 225 MHz and at power levels up to 100 watts, and there has been some experimental amateur operation since then. The FCC also has authorized Special Temporary Authority (STA) in some instances to allow broader SS experimentation. Since spread spectrum was introduced in the Amateur Radio service, commercial spread spectrum applications have been developed, including personal communication services, remote meter reading and position locating. But, the League had argued that rules limitations held back further spread spectrum experimentation. No changes are proposed in the frequency bands where spread spectrum is permitted.

The FCC said the rule amendments would 'increase spectrum efficiency and allow amateur operators to contribute to technological advances.' Comments on the NPRM in WT Docket 97-12 are due May 5, with reply comments due June 5.

NNNN
/EX

15. Re: SS Design

From: "Bill Bard" <wtba@eci-esyst.com>
Date: 5 Mar 1997 16:09:26 -0500
To: ss@tapr.org
Message-ID: <n1354544007.66512@qmgate.eci-esyst.com>
Rendered body type: text/plain

I would vote for a non-Ethernet solution. If Ethernet parts are that cheap, someone could then design a board which provides the ethernet interface and those that want it could get that interface card.

My SS design would utilize a microprocessor that would use either RS-232 or RS-422/423 to interface with the SS modem.

Bill Bard
wd4ixi@amsat.org

16. Re: [SS:1068] Re: SS Design

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Wed, 5 Mar 1997 18:00:18 -0500
To: ss@tapr.org
Message-ID: <199703052300.SAA25455@Muskegon.com.gasd102>
Rendered body type: text/plain

> From ss@tapr.org Wed Mar 5 17:03:02 1997
> Date: Wed, 5 Mar 1997 15:20:12 -0600 (CST)
> Originator: ss@tapr.org
> From: "Bill Bard" <wtba@eci-esyst.com>
> To: ss@tapr.org
> Subject: [SS:1068] Re: SS Design
> X-Listprocessor-Version: 6.0 -- ListProcessor by Anastasios Kotsikonas
> X-Comment: Tucson Amateur Packet Radio Spread Spectrum
> Content-Transfer-Encoding: quoted-printable
>
> I would vote for a non-Ethernet solution. If Ethernet parts are that
> cheap, someone could then design a board which provides the ethernet
> interface and those that want it could get that interface card.
>
> My SS design would utilize a microprocessor that would use either RS-232
> or RS-422/423 to interface with the SS modem.
>
> Bill Bard
> wd4ixi@amsat.org
>

This is a good reason for having a modular radio. Whoever wants RS-232, use it.
If you want Ethernet, then use that. Maybe a way around this is to have the SS
radio/modem operate in slow mode (data rate < 250kbps) for those who want to use
rs-232 and fast mode (data rate > 250kbps) for those who want to use Ethernet.

Using a microprocessor to control this (and the radio) would simplify this.

The next hurdle: FREQUENCY ????

Tony KE4ATO

17. Re: [SS:1069] Re: SS Design

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Wed, 5 Mar 1997 14:02:39 -1000
To: ss@tapr.org
Message-ID: <Pine.GS0.3.93.970305135756.26782B-100000@uhunix4>
Rendered body type: text/plain

On Wed, 5 Mar 1997, Tony Lanier wrote:

> ...
> > interface and those that want it could get that interface card.
> >
> > My SS design would utilize a microprocessor that would use either RS-232
> >
> ...
> This is a good reason for having a modular radio. Whoever wants RS-232, use it.
> If you want Ethernet, then use that. Maybe a way around this is to have the SS
> radio/modem operate in slow mode (data rate < 250kbps) for those who want to use
> rs-232 and fast mode (data rate > 250kbps) for those who want to use Ethernet.

That is why I suggested a programming port/option. Experiment and
configure as much as you like.

> Using a microprocessor to control this (and the radio) would simplify this.

>
> The next hurdle: FREQUENCY ????

>
I would recommend leaving that up to the user.

- Paul Beltrani, AH6NU

18. Z87200 SS TRx Eval Board

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Wed, 5 Mar 1997 14:11:59 -1000
To: ss@tapr.org
Message-ID: <Pine.GS0.3.93.970305140902.6581A-100000@uhunix4>
Rendered body type: text/plain

I just received a price on the Zilog Z87200 eval board of aprox \$700 U.S.
I am waiting for a price on just the chip.

Links to info on the chip and eval board @
<http://www.pixi.com/~beltrani/ss.html>.

- Paul Beltrani, AH6NU

19. Re: [SS:1065] Re: SS Design

From: dhoyer@frontiercorp.com
Date: Wed, 05 Mar 97 18:34:42 -0500
To: <ss@tapr.org>
Message-ID: <9703058576.AA857608629@ccm.frontiercorp.com>
Rendered body type: text/plain

>>>>Is the rest of the list interested in this thread?

Yes, I am! Absolutely!

Dan
KA9VMI

Reply Separator

Subject: [SS:1065] Re: SS Design
Author: <ss@tapr.org> at INTERNET
Date: 3/5/97 2:41 PM

On Tue, 4 Mar 1997 wb9mjn@wb9mjn.ampr.org wrote:

> Really don't see how a RS-232 port makes things easier for Voice com-
> munication. For Voice, some sorta in-box manually operated controls is the
> ideal. And these controls are much more expensive to develop than either
> the ethernet, or RS-232.

Quick example

Microphone --> CoDec chip --> serial data out --> SS Box
Speaker <-- Audio Amp <-- CoDec chip <-- serial data in <-- SS Box

Simple and cheap. My guess is << \$50 for the Audio/Codec stuff.

> The ethernet is cheaper, since both functions can be rolled into one
> port. Rather than having the cost of two ports, and the software development
> to handle both ports simultaneously, flawlessly. It would be a higher up
> front thing, but rolled into many units, there should be a payback.

You may be correct at an economy of scale level, but I am not sure there
is even enough interest to make developing a prototype worthwhile. (Other
than for the fun of it) Also, what I was suggesting does not require
simultaneous control of two ports. In fact, it does not even require two
ports. (See below)

> ...
> The thing is, that RS-232 seems cheap, but RS-232 is not really going to
> do the job above a couple hundred KB/s, in a standard computer. Then u need
> the PI-card, and the higher performance differential drivers. So, is there
> really a savings with RS-232 ? Or is it just a path to shifting the bucks
> into a PC interface card that is of limited production?
> ...

You are correct. Let me respond to those points.

1) RS-232 IS speed limited. However an RS-422 interface for the data side
will allow a chip like the Zilog Z8700 to operate at up to 2Mbps. We have
not really talked about how fast we would expect this SS Box to be. It is
not much of a benefit to talk to the box at 10Mbps if it can not process
the data that quickly.

2) True, you need a PI or similar interface to drive such an interface.

3) Yes, you would be shifting the cost of a "High Speed" interface outside
the SS Box. However, I was more interested in developing a piece of
hardware so people could begin experimenting with SS quickly. If you are
a network person and want speed, you could begin by setting up a 1024Kbps
RS-232 link and then work on developing a fast interface. It would be
simple to include connections for the experimenter to bypass the
RS-232/RS-422 interface.

> On voice, one might dispense with real time control altogether, and have
> a prom to set spreading, hopping, and center frequency. And just connect a
> microphone to it. □□□□

Based on your comment farther up about the need to "to handle both ports simultaneously, flawlessly." and this paragraph, I think we have a different idea about what I meant by a programming port. I am NOT suggesting real-time control of the the SS Box or real-time debugging. I was suggesting a way a way to preprogram parameters as you suggested and then let the device run. It was more of a conceptual block of the diagram. In fact, it may be reasonable to use only one I/O port and simply switch between "programming mode" and "run mode".

Personally, I like Ethernet. However I am trying to keep in mind that not everyone who is interested in SS is interested in data networks.

Is the rest of the list interested in this thread?

- Paul, AH6NU

20. Re: [SS:1063] Re: SS Design

From: dhoyer@frontiercorp.com
Date: Wed, 05 Mar 97 19:18:47 -0500
To: <ss@tapr.org>
Message-ID: <9703058576.AA857611447@ccm.frontiercorp.com>
Rendered body type: text/plain

The most popular thing I have seen to do with ethernet type device interface is to set up a terminal or telnet mode to program the device. e.g. you would telnet into the SS hardware with any TCP/IP telnet program for configuration. This could be done transparently while the unit is up and operational. However, the big "NOTE" here is that all of these devices have had an auxiliary RS-232 interface for "out-of-band" programming in addition to the ethernet interface.

Personally I like the RS-232 idea for simple async links, but there is going to be a bandwidth problem for people wanting to run high speed data. (some 5GHz systems are already up in the 10Mbps range for xfer rates) I think what needs to be done is a through analysis of the proposed requirements/features needed before we look at technology solutions for the problem. Once this is set, then we won't be shooting at a moving features target, and we can determine the hardware design from there. The bottom line is: "What do we want to do with this litte box when we're done building it?"

As I see it the main things we are considering so far for requirements are:

Transmission types:

- Voice
- Low speed data (probably async under 512Kbps)
- High speed data (probably over 2 Mbps)

Possible Interfaces:

- Audio
- RS-232
- Ethernet
- RS-422
- Fiber?
- Maybe a control panel programming mode on an LCD menu?

Range

- Short range <20 Miles
- Medium range >20 <100
- Long range >100

SS Chipset

- WHOS? Suggestions/Preferences?

CPU

- uController?
- full blown computer on board?
- software driven from a PC? No/minimal onboard cpu?

Hopping

- DSSS
- FHSS

Frequency Spectrum

- 900MHz
- 2 GHz

- 5 GHz
- 10 GHz
- Higher?
- Lower?

Standards

- Do we follow any? If so which ones?
- Data => 802.11 for WANS?
- Voice => I don't know if there are any...
- Do we create some?

What else needs to be considered?

Flexibility is paramount! The initial system design needs to be dynamic, using *CURRENT* technology or even future(-read, non mainstream yet), with a target goal in mind of what the end product needs to be after testing is complete! I suspect that the initial designs will be anything but cheap, but the final product is where you can compress everything learned in the development process into a relatively inexpensive package. Think about it - how the heck was the TNC-1 designed and implemented?

I didn't mean to rattle on so long, but I just got started, and all of this stuff just kind of spilled out of me. It seems to me that answering these questions will tell us what we need to build.

Cheers,

Dan
KA9VMI

- My 2.0112452 cents worth. (Pentium lookup error)

Reply Separator

Subject: [SS:1063] Re: SS Design
Author: <ss@tapr.org> at INTERNET
Date: 3/5/97 1:19 PM

I also argue for Ethernet. It's the "rs-232 of the '90s". The interfaces (chips and complete boards) are now universally available very cheap, the chips are much easier to talk to (especially since just about every operating system comes with built-in drivers) and of course it's far faster than RS-232. 10BaseT can be used in a simple 4-wire point-to-point mode, or with a hub it can handle many party-lined devices. Easier to transmit around the house too, given that 10Base T is already differentially encoded, while RS-232 is not.

I'm continually amazed at how many people keep trying to turn RS-232 into something like Ethernet (only much slower) to "save money", just as they keep trying to turn NOS into UNIX now that Linux is around...

Phil

21. Re: [SS:1064] Re: SS Design

From: Jerry Normandin <jerryn@ici.net>
Date: Wed, 05 Mar 1997 21:22:25 -0500
To: ss@tapr.org
Message-ID: <331E2A61.5AE2F2D9@ici.net>
Rendered body type: text/plain

Paul A Beltrani wrote:

```
>
> On Wed, 5 Mar 1997, Phil Karn wrote:
>
> > I also argue for Ethernet. It's the "rs-232 of the '90s". The
> > interfaces (chips and complete boards) are now universally available
> > very cheap, the chips are much easier to talk to (especially since
> > ...
> > I'm continually amazed at how many people keep trying to turn RS-232
> > into something like Ethernet (only much slower) to "save money", just
> > as they keep trying to turn NOS into UNIX now that Linux is around...
>
> Personally, I like Ethernet. I use it to network my Win95, SolarisX86 and
> Linux machines at home. However I suggested RS-232/RS422 to meet the
> "User application independent" design goal. Not everyone is into data
> networks.
>
> - Paul
I don't know about you but wireless internet access is my goal. I am
```

pulling it off now
with the NEC Wavelan Card. I would love to get a bulk purchase going.
I would like to
get the cards for \$200.00 each. Anyone here have time to set up a bulk
purchase?

22. Re: [SS:1065] Re: SS Design

From: Phil Karn <karn@laptop.ka9q.ampr.org>
Date: Wed, 5 Mar 1997 18:12:54 -0800 (PST)
To: ss@tapr.org
Message-ID: <m0w2Sfu-000RxcC@laptop.ka9q.ampr.org>
Rendered body type: text/plain

>1) RS-232 IS speed limited. However an RS-422 interface for the data side
>will allow a chip like the Zilog Z8700 to operate at up to 2Mbps. We have
>not really talked about how fast we would expect this SS Box to be. It is
>not much of a benefit to talk to the box at 10Mbps if it can not process
>the data that quickly.

And where do I get an RS-422 interface for my laptop? How much do
they cost?

10BaseT PCMCIA cards are now not much above \$100 retail in the big
computer stores. ISA Ethernet cards are dirt cheap. 10BaseT can be
used in a point-to-point mode over twisted pair cable (one pair in
each direction). And because those pairs are differential (like 422)
I can run substantial distances.

And I'm not limited to talking to just one device at a time with
Ethernet.

Suppose you give me a device with an RS-232 port. My laptop only has
one such port. I may use it with a TNC, or a CDMA or CDPD cellular
packet modem. Or I may need it for my Delorme Tripmate GPS
receiver. These other uses all preclude using it with your RS-232
interface at the same time unless I go out and buy a PCMCIA card
to get additional serial ports (which brings up the fact that I only
have two slots on this machine)

Or, of course, I kludge up some sort of RS-232 diode matrix a la the
old TNC 2 NET/ROM interconnects, then write some special driver
software to do CSMA on the diode matrix bus. All this to avoid using a
cheap, fast, widely available, thoroughly understood, reliable and
versatile technology, namely Ethernet?

Sounds entirely in keeping with the history of amateur packet radio
to me... :-)

Phil

23. Re: [SS:1064] Re: SS Design

From: Phil Karn <karn@laptop.ka9q.ampr.org>
Date: Wed, 5 Mar 1997 18:00:35 -0800 (PST)
To: ss@tapr.org
Message-ID: <m0w2STz-000RxbC@laptop.ka9q.ampr.org>
Rendered body type: text/plain

>Personally, I like Ethernet. I use it to network my Win95, SolarisX86 and
>Linux machines at home. However I suggested RS-232/RS422 to meet the
>"User application independent" design goal. Not everyone is into data
>networks.

Eh?

Who says Ethernet is limited to "data networking"? It can handle packetized
speech, audio and even video just fine, thank you...

Phil

24. Re: [SS:1063] Re: SS Design

From: Jerry Normandin <jerryn@ici.net>
Date: Wed, 05 Mar 1997 21:26:49 -0500
To: ss@tapr.org
Message-ID: <331E2B68.189E0FD4@ici.net>
Rendered body type: text/plain

Phil Karn wrote:
>

> I also argue for Ethernet. It's the "rs-232 of the '90s". The
> interfaces (chips and complete boards) are now universally available
> very cheap, the chips are much easier to talk to (especially since
> just about every operating system comes with built-in drivers) and of
> course it's far faster than RS-232. 10BaseT can be used in a simple
> 4-wire point-to-point mode, or with a hub it can handle many
> party-lined devices. Easier to transmit around the house too, given
> that 10Base T is already differentially encoded, while RS-232 is not.
>
> I'm continually amazed at how many people keep trying to turn RS-232
> into something like Ethernet (only much slower) to "save money", just
> as they keep trying to turn NOS into UNIX now that Linux is around...
>
> Phil
Why not?

Linux is powerfull and cheap to implement.
instead of dreaming I have three wireless router hop points up running
linux and they are
accessable to any laptop, PC , or computer running a NEC Wavelan device
that has permissions
to log in. It works! And I get 1.6MB/Sec transfer rates on ftp.

25. Re: [SS:1076] Re: SS Design

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Wed, 5 Mar 1997 19:59:05 -1000
To: ss@tapr.org
Message-ID: <Pine.GSO.3.93.970305193018.3561B-100000@uhunix4>
Rendered body type: text/plain

On Wed, 5 Mar 1997, Phil Karn wrote:

> >Personally, I like Ethernet. I use it to network my Win95, SolarisX86 and
> >Linux machines at home. However I suggested RS-232/RS422 to meet the
> >"User application independent" design goal. Not everyone is into data
> >networks.
>
> Eh?
>
> Who says Ethernet is limited to "data networking"? It can handle packetized
> speech, audio and even video just fine, thank you...

Packetized speech, audio and even video are data. Ethernet is a data
networking medium. It was designed to work with computer (data) networks.
I agree there are many instances where Ethernet is the more appropriate
technology and I do not want to get hung up with the semantics of this
discussion.

My point was, a serial interface would be more "multipurpose". Part of
the problem with trying to design a multipurpose device is, for some of
those purposes your design will not be optimal. For example, we could try
to pack this gizmo into a PCMCIA card to fit your laptop but those with
out such ports would be left out. However, almost every PC has a serial
port. Of course that is speed limited and you may want to use your only
serial port for something else.

My design goal, for the purpose of this discussion, was to develop a
simple "block" that people could use to build upon. If this gets any
farther than the discussion stage, would you be interested in working on
an Ethernet interface to more generic SS block?

- Paul

26. Re: SS Design

From: "Glenn S. Tenney KOTJ" <tenney@think.org>
Date: Thu, 6 Mar 1997 00:07:51 -0800
To: ss@tapr.org
Message-ID: <v03010d26af442a2e4a9d@[207.33.187.4]>
Rendered body type: text/plain

At 10:01 PM -0800 3/5/97, Paul A Beltrani wrote:
>My point was, a serial interface would be more "multipurpose".

I believe that we need a modern, current, off-the-shelf solution for data
networking. Ethernet is clearly the choice. A serial interface would not
be more multipurpose. On the contrary, a serial interface would provide
far less functionality and expandability for a modern data network... it is
speed and distance limited where ethernet is not.

Now, if what you want developed is a nice way to do keyboard to keyboard at 9600 baud... then serial is the way to go. I want to find ways to do multi megabit data networking.

Glenn Tenney K0TJ
tenney@think.org
Voice: (415) 574-3420

Fantasia Systems Inc.
<http://www.think.org/>
Fax: (415) 574-0546 Ham radio: AA6ER

27. Re: [SS:1079] Re: SS Design

From: Paul A Beltrani <beltrani@hawaii.edu>
Date: Wed, 5 Mar 1997 23:25:35 -1000
To: ss@tapr.org
Message-ID: <Pine.GS0.3.93.970305231235.22351A-100000@uhunix4>
Rendered body type: text/plain

On Wed, 5 Mar 1997, Glenn S. Tenney K0TJ wrote:

> At 10:01 PM -0800 3/5/97, Paul A Beltrani wrote:
> >My point was, a serial interface would be more "multipurpose".
>
> I believe that we need a modern, current, off-the-shelf solution for data
> networking. Ethernet is clearly the choice. A serial interface would not
> ...
> 9600 baud... then serial is the way to go. I want to find ways to do multi
> megabit data networking.

I agree, if all you are interested in is the single purpose of networking.

This would be a good time to see what people would be interested in using this vaporware box for. If the vast majority have networks in mind, then it makes sense to design for that.

- Paul

28. Re: SS Design

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Thu, 06 Mar 1997 06:45:46 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970306114546.003b9b60@mindspring.com>
Rendered body type: text/plain

Paul, AH6NU wrote in [SS:1065]:

>
>Personally, I like Ethernet. However I am trying to keep in mind that
>not everyone who is interested in SS is interested in data networks.
>
>Is the rest of the list interested in this thread?
>

Apparently they are.

Personally I like Ethernet too, but Paul is right, there are other people out there who don't want to have to network a computer with their radio just to send voice.

Maybe we should decide we don't care about them.

dhoyer@frontiercorp.com wrote in [SS:1073]

>I think what needs to be done is a through analysis of the proposed
>requirements/features needed before we look at technology solutions for the
>problem. Once this is set, then we won't be shooting at a moving features
>target, and we can determine the hardware design from there. The bottom line
>is: "What do we want to do with this litte box when we're done building it?"

I agree. We can throw alternate designs against the wall all day long, but how about some discussion about what we want to accomplish.

It seems that the majority of interest is in high speed networks with a plug and play solution at a fraction of the cost of commercial part 15.247 devices. Sort of a current technology TNC. I guess that's to be expected since TAPR is into "Packet Radio". So if that's what everybody wants then let's go for it whole hog.

I say we should forget about building a radio that can be used to prove that SS can share 6M, 2M, 220, and 440 spectrum with existing users, or make more efficient use of existing spectrum. We addressed that in our STA, but no

one seems interested in it. We should let the FM, weak signal, and SSB users defend "their" spectrum from the commercial interests who have monetary gain in establishing that SS can co-exist there.

Let's go for 900MHz and above and elbow our way in there beside the other users in overlapping and nearby unlicensed WLAN spectra. We can use technology developed for their applications but blow their performance away with our superior ERP because of our licensed status. Then we can build a network with multi-megabit throughput. I suspect though that it will be grossly under-used because of the content/origination verification restrictions we face.

Would we be better off forgetting our licensed status and build a lower performance or higher cost (more nodes) unlicensed semi-private ampr net for unrestricted access the Internet? That's apparently what Jerry Normandin <jerryn@ici.net> wants in [SS:1074].

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
<http://www.mindspring.com/~lfry/part15.htm>

29. WT Docket No. 97-12 - Hollow Victory?

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Thu, 06 Mar 1997 06:59:51 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970306115951.003ccea0@mindspring.com>
Rendered body type: text/plain

Looks like we have done it to ourselves now.

The PRM submitted by ARRL and supported by FCC contains provisions that will kill the possibility of easily leveraging off of commercial devices for our efforts. The killers are automatic transmitter power control and retention of the station ID requirements.

As far as I know, none of the chipset solutions currently available for SS applications in 900MHz or 2.4 GHz can support these requirements.

The only way I see out of this is to propose that as long as ERP doesn't exceed part 15.247 limits then no control would be required, and go in for eliminating the Station ID requirements. Not too satisfactory, because then we might as well be operating under part 15 and not worrying about content.

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
<http://www.mindspring.com/~lfry/part15.htm>

30. Re: [SS:1081] Re: SS Design

From: Magne Mahre <magne@radar.no>
Date: Thu, 6 Mar 1997 14:29:45 +0100 (MET)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.91.970306142159.16352B-100000@ghosthost.radar.no>
Rendered body type: text/plain

On Thu, 6 Mar 1997, Lee W. Fry wrote:

> Let's go for 900MHz and above and elbow our way in there beside the other
> users in overlapping and nearby unlicensed WLAN spectra.

If the decision is that one's going to put all the RF-parts into the project (and not base oneself on transverters), may I suggest that one settle for a frequency band allocated to the amateur service in a larger area than just region 2 ?

Region 1 has the following allocations:

432-438
1240-1300
2300-2450
3400-3500
5650-5850
10250-10500
24000-24050
..
..

31. Interface Requirements

From: "Lee W. Fry" <lfry@wdl.lmco.com>
Date: Thu, 06 Mar 1997 08:48:27 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970306134827.008c81b4@wdl1.wdl.lmco.com>
Rendered body type: text/plain

Let's assume we are talking about a data radio.

Independent of host architecture. Says it is not ISA or PCMCIA bus, or bi-directional parallel port. Even though these are relatively open standards, what about hooking it to your old Sun SPARC?

At least 500 foot drive distance. To minimize transmission line losses mount the whole thing at the antenna on the tower on the hill.

Might also be nice if DC power could be run through the same interface.

Throughput of at least 2 Mbps, with growth to 10 Mbps. 2 Mbps is what's supported by the current crop of 2.4 GHz systems. Some vendors are getting 4 Mbps at 5 GHz.

Plug and Play with Windows 3.1, 95, NT, OS2, Linux, BSD, and other *NIX inter-networking applications. To me, this means if it is ethernet, it looks like a tcp/ip router. If it's serial, I can use anything from dumb terminal to PPP across it.

Any more?

Lee, AA0JP

32. RE: 1080] Re: SS Design

From: efbrya - Eric Bryan <efbrya@acxiom.com>
Date: Thu, 6 Mar 1997 08:16:13 -0600
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <c=US%a=%p=Acxiom_Corporati%l=PO-CONWAY-1-970306141613Z-18063@po-conway-1.conway.acxiom.com>
Rendered body type: text/plain

I don't think it would be that hard to do both. It would be nice to have a serial port for debugging, monitoring, parameter setting, and tuning anyway.

Eric Bryan
efbrya@acxiom.com

>
>>This would be a good time to see what people would be interested in using
>>this vaporware box for. If the vast majority have networks in mind,
>>then it makes sense to design for that.
>
>
>

33. RE: 1081] Re: SS Design

From: efbrya - Eric Bryan <efbrya@acxiom.com>
Date: Thu, 6 Mar 1997 08:22:18 -0600
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <c=US%a=%p=Acxiom_Corporati%l=PO-CONWAY-1-970306142218Z-18125@po-conway-1.conway.acxiom.com>
Rendered body type: text/plain

>>I say we should forget about building a radio that can be used to prove that
>>SS can share 6M, 2M, 220, and 440 spectrum with existing users, or make more
>>efficient use of existing spectrum. We addressed that in our STA, but no

I am interested in these lower freq. just to get greater range with out having
to find places to stick repeaters all over the countryside. I want to do 200 mile hops
at a minimum. Lower frequencies are also easier to find parts for (at least it seems
that way to me).

Eric Bryan
efbrya@acxiom.com

>
>

34. Re: [SS:1081] Re: SS Design

From: wb9mjn@wb9mjn.ampr.org
Date: Thu, 06 Mar 97 07:46:51 UTC
To: ss@tapr.org
Message-ID: <12999@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Everybody (!)

A modular box makes allot of sense. But a box that needs to be re-done, because it does not have the guts to do the job, isn t really modular. That s probably the best reason to just do a ethernet port for all control, and data i/o. Its one thing, instead of 2, with all the performance thats needed. We DO have a UDP/IP stack laying around that can be made to work for control. We DO have a TCP/IP stack for the data communication. So, the software job is well along, right now.

I think the objection to the Ethernet is mostly because people want to attach a microphone to a stand-alone radio, without needing a computer. So, does it make sense to put an analog port on the SS exciter module? The bits from the codec would come thru the cpu, and be spliced in with data com bits, if any. This way, simultaneous voice/data could be done. Or just stand-alone voice too.

This is kinda messy tho. And the more I think about it, Its just not worth the extra conglomeration of hardware parts. We need to look down the future here. We can load up the box with lots of things we think it will need, or we can cut it just what it will need, with the foresight that the bulky stuff will get smaller. Indeed, a Ethernet microphone can t be that hard, right ? Sure, nobody has done things this way before. But nobody is doing a modular SS exciter either. All the other projects are somewhat application specific.

So, I guess the crux of the issue here, is that altho, its allot more money in the speaker mic, is this going to a future trend, that we start, or is it a bad idea?

Another way might be to put the Ethernet Speaker Mic guts into the SS exciter, and hang it off the Ethernet internally.

What makes this all thinkable, is that we have NOS, and (i think) we can put surface mount dedicated computers into things the size of hand held microphones. That is, technology has developed a whole bunch. Sure, one can use the full duplex speaker phone in a computer to do this same thing, but for a non-computer networking application, a Ethernet Speaker Mic, might work out too. Is this not what you were proposing with RS-232, only ethernetted, Paul?

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

35. Re: [SS:1082] WT Docket No. 97-12 - Hollow Victory?

From: Lyle Johnson <lylej@azstarnet.com>
Date: Thu, 06 Mar 1997 07:41:50 -0700
To: ss@tapr.org
Message-ID: <3.0.32.19970306074137.0071c15c@pop.azstarnet.com>
Rendered body type: text/plain

Lee,

>The killers are automatic transmitter power control...
>...As far as I know, none of the chipset solutions currently available for SS
>applications in 900MHz or 2.4 GHz can support these requirements.

The Harris PRISM chipset has an ADC that measures incoming signals and this

measurement is available in a register. It also supports, I beleive, stepped power output levels. This is from memory, the Harris apps guy was in my office last week for a couple hours and I may have forgottern something (I'm not at work as I write this).

Anyway, one can look at BER or retries or ??? and then set the power level by the processor that must be embedded in this widget anyhow. Automatic power control isn't a big deal IMHO -- heck, even the HF guys use it (clover and the like) :-)

>and retention
>of the station ID requirements.

I'm sure there is a way to solve this, too...

Cheers,

Lyle

36. Re: [SS:1075] Re: SS Design

From: Bob Lorenzini <hwm@netcom.com>
Date: Thu, 6 Mar 1997 07:13:41 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970306071036.211B-100000@mm.wd6dod.ampr.org>
Rendered body type: text/plain

I agree with all those advocating an ethernet interface and would like to stress two points. It makes remoting the unit close to the ant much easier and all OS's can talk IP over ethernet. No need for those who do not run linux to learn unix.

Bob - wd6dod

37. RE: 1085] RE: 1080] Re: SS Design Interfaces

From: "Rochford, Richard E." <rero@cbmsmail.cb.lucent.com>
Date: 6 Mar 97 10:43:00 -0500
To: "ss" <ss@tapr.org>
Message-ID: <331EE610@cbmsmail.cb.lucent.com>
Rendered body type: text/plain

If you are looking for faster data rates, (digital including speech, text, video etc.), ethernet is a way to go. However, this implies there is some other interface, RS232 etc. i.e. a console port, which is needed to administer the ethernet interface.

I currently work on a product with an ethernet interface and no console port, requiring us to use a default IP address and come up with an elaborate method of burning the MAC address.

Obtaining and assigning MAC addresses is an other administrative chore which has to be centralized somewhere for a project like this.

Richard E. Rochford WB7RPH
r.e.rochford@lucent.com

38. Re: [SS:1082] WT Docket No. 97-12 - Hollow Victory?

From: "Robert Barron" <BARRON@liant.com>
Date: Thu, 6 Mar 1997 10:10:28 -0600 CST
To: ss@tapr.org
Cc: lfry@mindspring.com
Message-ID: <44AE0207A4@rm1.liant.com>
Rendered body type: text/plain

Lee Fry wrote:

> Looks like we have done it to ourselves now.
>
> The PRM submitted by ARRL and supported by FCC contains provisions that will
> kill the possibility of easily leveraging off of commercial devices for our
> efforts. The killers are automatic transmitter power control and retention
> of the station ID requirements.
>
> As far as I know, none of the chipset solutions currently available for SS
> applications in 900MHz or 2.4 GHz can support these requirements.
>
> The only way I see out of this is to propose that as long as ERP doesn't
> exceed part 15.247 limits then no control would be required, and go in for
> eliminating the Station ID requirements. Not too satisfactory, because then

> we might as well be operating under part 15 and not worrying about content.

The ARRL proposal (RM-8737) states that automatic power control be implemented for systems which run more than 1W of power. Since all Part 15 devices (to the best of my knowledge) run 1W or less this rule should not hinder Hams at all.

The ID requirement, on the other hand, will require some solution, either regulatory (which will take a long time - see how long it took the FCC to turn the proposal into a NPRM) or technical (I think I once saw someone offer up a solution to "key" up the SS radio like a CW rig).

And even if we limit ourselves to 1W then we still have some benefits to being Amateurs. Part 15 has an ERP limitation that we do not. So I guess we get something for the restrictive rules under which we have to live (content, ID, first forwarding, etc.).

73,

Robert Barron, KA5WSS
Liant Software Corporation

barron@liant.com
Hook 'Em Horns!

39. Re: [SS:1082] WT Docket No. 97-12 - Hollow Victory?

From: mciminer@jazz.jpl.nasa.gov (Michael Ciminera)
Date: Thu, 6 Mar 97 08:13:45 PST
To: ss@tapr.org
Message-ID: <9703061613.AA10287@jazz.Jpl.Nasa.Gov>
Rendered body type: text/plain

Oh boy,

> Looks like we have done it to ourselves now.
>
> The PRM submitted by ARRL and supported by FCC contains provisions that will
> kill the possibility of easily leveraging off of commercial devices for our
> efforts. The killers are automatic transmitter power control

Yeah, no kidding. The complications of SNR/BER determination, minimum ERP calculation and power control implementation are something HAM usage would rather NOT be forced to do.. Can this be undone?

mike
wc6a

40. Re: [SS:1068] Re: SS Design

From: N5RG@aol.com
Date: Thu, 6 Mar 1997 11:41:47 -0500 (EST)
To: ss@tapr.org
Message-ID: <970306114146_851659732@emout03.mail.aol.com>
Rendered body type: text/plain

> I would vote for a non-Ethernet solution. If Ethernet parts are that
> cheap, someone could then design a board which provides the ethernet
> interface and those that want it could get that interface card.
>

The latest JDR catalog lists Ethernet cards for \$29.95. Why not take advantage of them? They transmit packets.

73, Roy W7IDM, ex N5RG

41. Re: [SS:1062] Re: SS Design

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Thu, 6 Mar 1997 10:50:03 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.91.970306104650.6817A-100000@tekdata.com>
Rendered body type: text/plain

On Wed, 5 Mar 1997 wb9mjn@wb9mjn.ampr.org wrote:

>
> Hi Paul,
>
> Really don't see how a RS-232 port makes things easier for Voice com-

> munication. For Voice, some sorta in-box manually operated controls is the
> ideal. And these controls are much more expensive to develop than either
> the ethernet, or RS-232.
>
> The ethernet is cheaper, since both functions can be rolled into one
> port. Rather than having the cost of two ports, and the software development
> to handle both ports simultaneously, flawlessly. It would be a higher up
> front thing, but rolled into many units, there should be a payback.
>
> Altho, this idea might work with a parallel port as well. As has been
> done in some of the European packet networking hardware. A bidirectional
> parallel port would have enough capacity for control and moderate data rates.
> Somebody should double check me on that statement, tho!

It could work.. this is how (portable, non-SCSI) Zip drives work.

>
> The thing is, that RS-232 seems cheap, but RS-232 is not really going to
> do the job above a couple hundred KB/s, in a standard computer. Then u need
> the PI-card, and the higher performance differential drivers. So, is there
> really a savings with RS-232 ? Or is it just a path to shifting the bucks
> into a PC interface card that is of limited production?

The new "USB" port could be useful as well. Its supposed to run at up to
2MBPS I think... But then again that won't help people with all but the
newest of machines..I agree with Don on the ethernet card. RS-232 interfaces
cant even handle ISDN speeds well. Why design something new with a bottle
neck in place from the beginning?

42. Re: [SS:1065] Re: SS Design

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Thu, 6 Mar 1997 11:02:13 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.91.970306105429.6817B-100000@tekdata.com>
Rendered body type: text/plain

On Wed, 5 Mar 1997, Paul A Beltrani wrote:

>
>
> On Tue, 4 Mar 1997 wb9mjn@wb9mjn.ampr.org wrote:
>
> > Really don't see how a RS-232 port makes things easier for Voice com-
> > munication. For Voice, some sorta in-box manually operated controls is the
> > ideal. And these controls are much more expensive to develop than either
> > the ethernet, or RS-232.
>
> Quick example
> Microphone --> CoDec chip --> serial data out --> SS Box
> Speaker <-- Audio Amp <-- CoDec chip <-- serial data in <-- SS Box
>
> why do you need rs-232 for this.. how about a simple TTL level serial port
> in addition to a ethernet NIC?
>
> Simple and cheap. My guess is << \$50 for the Audio/Codec stuff.
>

Why not build this onto the board. You can always socket the codecs
and have the option to leave them off the boards???

> > The ethernet is cheaper, since both functions can be rolled into one
> > port. Rather than having the cost of two ports, and the software development
> > to handle both ports simultaneously, flawlessly. It would be a higher up
> > front thing, but rolled into many units, there should be a payback.
>
> You may be correct at an economy of scale level, but I am not sure there
> is even enough interest to make developing a prototype worthwhile. (Other
> than for the fun of it) Also, what I was suggesting does not require
> simultaneous control of two ports. In fact, it does not even require two
> ports. (See below)

I tell you what: I'd only build one if it included a ethernet port. I
have multiple computers and the concept of having it hooked to only one
via a serial port is really not workable.

>
> > ...
> > The thing is, that RS-232 seems cheap, but RS-232 is not really going to
> > do the job above a couple hundred KB/s, in a standard computer. Then u need
> > the PI-card, and the higher performance differential drivers. So, is there

> > really a savings with RS-232 ? Or is it just a path to shifting the bucks
> > into a PC interface card that is of limited production?
> > ...

EXACTLY>...

>

> You are correct. Let me respond to those points.
> 1) RS-232 IS speed limited. However an RS-422 interface for the data side
> will allow a chip like the Zilog Z8700 to operate at up to 2Mbps. We have
> not really talked about how fast we would expect this SS Box to be. It is
> not much of a benefit to talk to the box at 10Mbps if it can not process
> the data that quickly.

Geeze.. \$200 for an Z8700 interface card vs \$20 for an ethernet card...
makes sense to me.. (NOT)....)

Fred KA9VAW
fred@tekdata.com

43. Re: [SS:1091] Re: Morse ID at 20 WPM amidst 2 MBps data

From: Steve Sampson <ssampson@claven.tinker.af.mil>
Date: Thu, 06 Mar 1997 11:43:08 -0600
To: ss@tapr.org
Message-ID: <331F022C.794B@eds.tinker.af.mil>
Rendered body type: text/plain

Robert Barron wrote:

>

> Lee Fry wrote:
> > Looks like we have done it to ourselves now.
> >

> The ARRL proposal (RM-8737) states that automatic power control
> be implemented for systems which run more than 1W of power.

This is completely acceptable.

Everyone shake their (FCC, ARRL) hand, say "good job", and "just do it."
Just slip them a note that says kill the ID requirement.

If they leave the ID requirement in, then it's a failure, I'll go
part 15 or 95 :-)

Steve

44. Re: [SS:1088] Re: WT Docket No. 97-12 - Hollow Victory?

From: Jeff King <jeff@mich.com>
Date: Thu, 06 Mar 1997 12:49:08 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970306174908.007271ec@mail.mich.com>
Rendered body type: text/plain

At 08:49 AM 3/6/97 -0600, Lyle Johnson wrote:

>Lee,

>

>>The killers are automatic transmitter power control...
>>...As far as I know, none of the chipset solutions currently available for SS
>>applications in 900MHz or 2.4 GHz can support these requirements.
>

>The Harris PRISM chipset has an ADC that measures incoming signals and this

I think automatic power control is both a good idea and technically
doable. I DO however have a problem with it being mandated by law
when SS is the ONLY service in amateur radio in which it is being
mandated. BTW, the Zilog hopper chip also supports power control.

So the ARRL is saying that amateurs that run SS are too stupid to use
the minimum power required to make communications? (as required
by law). So all those DX'ers that are running kilowatts don't need
automatic power control? Or the local 2metre repeater that is running
400 watts shouldn't use automatic power control?

Automatic power control is technically possible for almost every
modulation mode. I have a serious problem with SS being singled
out by the ARRL, in particular with legal regulations.

>Anyway, one can look at BER or retries or ??? and then set the power level
>by the processor that must be embedded in this widget anyhow. Automatic
>power control isn't a big deal IMHO -- heck, even the HF guys use it

>(clover and the like) :-)

Yeap, they use automatic power control because it makes sense. And gosh, they don't even need the government telling them to do it! I guess those spread spectrum folks are just too stupid to realize the advantages of power control. Gotta get the government involved to keep the threat of SS to amateur radio under control.

>
>>and retention
>>of the station ID requirements.
>
>I'm sure there is a way to solve this, too...
>

Yeap, any thoughts on commenting on the NPRM? Best way to solve that one would be to remove it (i.e. put the ID in the data stream) Or is it too late? I must have been asleep at the switch if I missed the above two points Lee raised.

-Jeff wb8wka

45. Re: [SS:1083] Re: SS Design

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Thu, 6 Mar 1997 11:22:49 -0600 (CST)
To: ss@tapr.org
Cc: ss@tapr.org
Message-ID: <Pine.BSF.3.91.970306110948.6817D-100000@tekdata.com>
Rendered body type: text/plain

On Thu, 6 Mar 1997, Magne Mahre wrote:

>
>
> On Thu, 6 Mar 1997, Lee W. Fry wrote:
>
> > Let's go for 900MHz and above and elbow our way in there beside the other
> > users in overlapping and nearby unlicensed WLAN spectra.
>
> If the decision is that one's going to put all the RF-parts into the
> project (and not base oneself on transverters), may I suggest that one
> settle for a frequency band allocated to the amateur service in a larger area
> than just region 2 ?
>
> Region 1 has the following allocations:
>
> 432-438
> 1240-1300
> 2300-2450
> 3400-3500
> 5650-5850
> 10250-10500
> 24000-24050
>

the 1.2 Ghz band, 2.4 GHz band and 3.4 GHz bands are do-able without too many exotic parts. We are in the process of getting stripped of our 2.4 GHz band... maybe something like in the 2420 MHz area would be good.. maybe we could save that band.

I've been kicking around the idea of running like 115+ KBPS non-SS simple, high bandwidth FSK on this band. The funny thing is that we could do this now, it'd be legal, it'd be faster than most people's current, the bandwidth is available... but we fear microwaves.

Something like a really simple interface at 2M or 70CM could be a mod/demod for a transverter, or even better something directly at the frequency could be made to do this rather inexpensively.

Hell, it might even be possible to make an interface from 10-base-T to modulate a setup for 10 MBPS links up on the higher microwave bands. (This would simplify computer interfaces a tad bit, don't you think??)

Why not, what's 20 or 30 MHz of spectrum in a band that has 500 MHz that no one uses?

Fred M. Spinner, KA9VAW
fred@tekdata.com

46. Re: [SS:1075] Re: SS Design

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Thu, 6 Mar 1997 11:05:33 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.91.970306110324.6817C-100000@tekdata.com>
Rendered body type: text/plain

On Wed, 5 Mar 1997, Phil Karn wrote:

> >1) RS-232 IS speed limited. However an RS-422 interface for the data side
> >will allow a chip like the Zilog Z8700 to operate at up to 2Mbps. We have
> >not really talked about how fast we would expect this SS Box to be. It is
> >not much of a benefit to talk to the box at 10Mbps if it can not process
> >the data that quickly.
>
> And where do I get an RS-422 interface for my laptop? How much do
> they cost?

You can get converters from the balanced RS-422 to the RS-232.. but
I think the lack of speed ability of the RS-232 on your laptop is
the real problem...

We use B&B electronics ones when our customers have to run a serial
line several hundred feet. They cost about \$60 a side.. still more \$\$\$
than an ethernet card.
>

47. Re: [SS:1091] Re: WT Docket No. 97-12 - Hollow Victory?

From: Jeff King <jeff@mich.com>
Date: Thu, 06 Mar 1997 12:59:02 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970306175902.008fba9c@mail.mich.com>
Rendered body type: text/plain

At 10:14 AM 3/6/97 -0600, Robert Barron wrote:

>Lee Fry wrote:
>> Looks like we have done it to ourselves now.
clip

>
>The ARRL proposal (RM-8737) states that automatic power control
>be implemented for systems which run more than 1W of power. Since
>all Part 15 devices (to the best of my knowledge) run 1W or less
>this rule should not hinder Hams at all.

Yeah, OK. Why even run under part 97 then? WAY to much liability.
Do you think they made this proposal not being aware of this?

>And even if we limit ourselves to 1W then we still have some
>benefits to being Amateurs. Part 15 has an ERP limitation that we
>do not. So I guess we get something for the restrictive rules under
>which we have to live (content, ID, first forwarding, etc.).

>
>73,
>

>Robert Barron, KA5WSS barron@liant.com
>Liant Software Corporation Hook 'Em Horns!

The only thing we get for the restrictive rules we live under is
a decaying service. The rules should be reduced and liberalized to
reflect present day society, not some ozzy and harriet 1950's
view of amateur radio.

-Jeff wb8wka

48. Data Interfaces

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Thu, 6 Mar 1997 14:23:55 -0500
To: ss@tapr.org
Message-ID: <199703061923.0AA26057@Muskegon.com.gasd102>
Rendered body type: text/plain

Is there any reason why we CAN NOT have a data interface
module for the SS box? For example, can we spec the data
rate coming out of the SS box at say 1Mbps, but then rate
buffer the data to a slower rate (using a FIFO) for those
who want to develop a RS-232/RS-422 interface module?

The data moving through the SS box will need to be set at

a constant rate, just the data moving to and from it can vary.

Tony KE4ATO

49. Re: [SS:1098] Re: SS Design

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Thu, 6 Mar 1997 14:30:02 -0500
To: ss@tapr.org
Message-ID: <199703061930.0AA26060@Muskegon.com.gasd102>
Rendered body type: text/plain

> the 1.2 Ghz band, 2.4 GHZ band and 3.4 GHz bands are do able without too
> many exotic parts. We are in the process of getting stripped of our
> 2.4 GHz band... maybe something like in the 2420 MHz area would be good..
> maybe we could save that band.
>
> Fred M. Spinner, KA9VAW
> fred@tekdata.com
>
>

This is the reason why we need a modular radio. Whoever wants to go microwave, go do it! If and when we can do HF, then do HF.

If for any other reason, we (or anyone else) can't seem to agree on the band of choice.

Tony KE4ATO

50. Re: [SS:1083] SS digest 258

From: jmorriso@bogomips.com (John Paul Morrison)
Date: Thu, 6 Mar 1997 12:51:10 -0800 (PST)
To: ss@tapr.org
Message-ID: <m0w2k86-000TwZC@bogomips.com>
Rendered body type: text/plain

>
> Date: Wed, 5 Mar 1997 02:13:05 -0800 (PST)
> From: Phil Karn <karn@laptop.ka9q.ampr.org>
> To: ss@tapr.org
> Subject: Re: SS Design
> Message-ID: <m0w2Dh3-000RxcC@laptop.ka9q.ampr.org>
>
> I also argue for Ethernet. It's the "rs-232 of the '90s". The
> interfaces (chips and complete boards) are now universally available
> very cheap, the chips are much easier to talk to (especially since
> just about every operating system comes with built-in drivers) and of
> course it's far faster than RS-232. 10BaseT can be used in a simple
> 4-wire point-to-point mode, or with a hub it can handle many
> party-lined devices. Easier to transmit around the house too, given
> that 10Base T is already differentially encoded, while RS-232 is not.
>
> I'm continually amazed at how many people keep trying to turn RS-232
> into something like Ethernet (only much slower) to "save money", just
> as they keep trying to turn NOS into UNIX now that Linux is around...

Linux? Can we quote you as an endorser of Linux, coming from a BSD guy? :-)

But anyway, I saw Alan Cox the Linux network code designer talking about your sound blaster code with FEC coding. Does this code exist for NOS or Linux? (I know the soundblaster code and viterbi code exist separately, but are they rolled into one device now?)

What's interesting about Linux, and I don't mean to plug it in a partisan way, is that people have written all sorts of interesting networking protocols into it, and also support for some ham radio hardware. Stuff like AX.25, NetROM, Rose (X.25 plp for packet radio), even IPX, Appletalk. There's also DecNet, X.25 and 802.3 LLC and bridging. Hardware such as TNCs, PI cards, Baypacs etc.

And now there is a sound card driver in Linux that is supposed to do 1200, 4800 and 9600bps packet radio. I don't think it does FEC but that would be interesting to experiment with. The driver might do fax and rtty but I'm not sure if that's done yet.

I've seen a few comments on this list about building hardware and it resembles some of the flurry of excitement on the TNC-The

Next Generation list, which went nowhere. A lot of people (myself included) were interested in designing and building a neat new box with all sorts of features. But that fizzled. I realized that even if a fancy box were built, it would have to go through numerous hardware revisions (it's expensive to beta test HARDware), and the software would be where it all falls apart, because it takes time and money to port a complex program to a new box, or to write it from scratch.

I've come round to your thinking of using a generic PC to do all the DSP and coding. It's far easier to leverage the PC software (ie Linux or the GCC version of NOS/TNOS) to control a new device. IF a 386 with a soundblaster can replace a traditional multiport 1200/9600bps TNC, then a 486 or Pentium could do spread spectrum or something else. There's also free software that does Iphone like features, multicast audio etc. So a PC could do voice or video as well not just "data" networking.

Ascend and Cisco can take Motorola 68EN360's, ethernet, serial, flash and dram and sell little remote access routers for \$1000 or less because they have the sales volume to make the hardware prices cheaper and to amortize the programming development over many other products that use the same software. Hams can't build anything that fancy AND that cheap.

> Phil
>
>

BogoMIPS Research Labs -- bogosity research & simulation -- VE7JPM --
jmorriso@bogomips.com ve7jpm@ve7jpm.ampr.org jmorriso@ve7ubc.ampr.org

51. Re: [SS:1088] Re: WT Docket No. 97-12 - Hollow Victory?

From: dhoyer@frontiercorp.com
Date: Thu, 06 Mar 97 11:49:52 -0500
To: <ss@tapr.org>
Message-ID: <9703068576.AA857670848@ccm.frontiercorp.com>
Rendered body type: text/plain

I don't know if anyone else put this up here, but here's the Harris web site for the Prism chipset:

<http://www.semi.harris.com/PRISM.html>

Dan
KA9VMI

Subject: [SS:1088] Re: WT Docket No. 97-12 - Hollow Victory?
Author: <ss@tapr.org> at INTERNET
Date: 3/6/97 8:49 AM

Lee,

>The killers are automatic transmitter power control...
>...As far as I know, none of the chipset solutions currently available for SS
>applications in 900MHz or 2.4 GHz can support these requirements.

The Harris PRISM chipset has an ADC that measures incoming signals and this measurement is available in a register. It also supports, I beleive, stepped power output levels. This is from memory, the Harris apps guy was in my office last week for a couple hours and I may have forgottern something (I'm not at work as I write this).

Anyway, one can look at BER or retries or ??? and then set the power level by the processor that must be embedded in this widget anyhow. Automatic power control isn't a big deal IMHO -- heck, even the HF guys use it (clover and the like) :-)

>and retention
>of the station ID requirements.

I'm sure there is a way to solve this, too...

Cheers,

Lyle

52. Re: [SS:1095] Re: SS Design

From: "Steven M. Ruiz" <steve@a.crl.com>
Date: Thu, 6 Mar 1997 16:55:24 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.91.970306164638.23110D-100000@bryce.ampr.org>
Rendered body type: text/plain

On Thu, 6 Mar 1997, Fred M. Spinner wrote:

>
> Geeze.. \$200 for an Z8700 interface card vs \$20 for an ethernet card...
> makes sense to me.. (NOT)...:)
>

Geeze yourself, I purchase my ethernet cards for \$14.00 each in single quantity and even less for bulk purchases or 5 or more. :) The point is value per dollar.

If on board processing for voice, video, frequency control, etc. is needed there are Single Board Computers (SBC's) that are plenty cheap and powerful enough to do the job. The SBC's can be built into the SS box or connected via ethernet (RG-58) cabling. This keeps with the idea of modularity.

Steve, KN6XQ

53. Re: [SS:1088] Re: WT Docket No. 97-12 - Hollow Victory?

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Thu, 06 Mar 1997 19:17:02 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970307001702.003dde80@mindspring.com>
Rendered body type: text/plain

At Thu, 6 Mar 1997 08:49:17 -0600 (CST), Lyle Johnson wrote in [SS:1088]:

>Anyway, one can look at BER or retries or ??? and then set the power level
>by the processor that must be embedded in this widget anyhow. Automatic
>power control isn't a big deal IMHO -- heck, even the HF guys use it
>(clover and the like) :-)

I am sure that there is a reasonable way to modulate power too. But the actual wording of the ARRL proposed rule is:

The transmitter power output must not exceed 100 W under any circumstances. If more than 1 W is used, automatic transmitter control shall limit output power to that which is required for the communication. This shall be determined by use of the ratio, measured at the receiver, of the received energy per user data bit (Eb) to the sum of the received power spectral densities of noise (No) co-channel interference (Io). Average transmitter power over 1 W shall automatically adjusted to maintain an Eb/(No+Io) ratio of no more than 23 db at the intended receiver .

I am not smart enough about the theory to figure out how to transform the BER the Prism chip measures or higher level protocol metrics like retries into the ARRL power metric (Eb/(No+Io) < 23 db). Robert Buaas in his comments on the PRM said " the hardware needed to control power output is simple, the algorithms required to determine how to dynamically adjust the hardware are not" I believe him.

How about it anybody? Is the conversion from BER (or anything else available from available chip sets) to Eb/(No+Io) simple and is it implemented in any of the transceiver interfaces available?

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
<http://www.mindspring.com/~lfry/part15.htm>

54. Re: [SS:1097] Re: WT Docket No. 97-12 - Hollow Victory?

From: Lyle Johnson <lylej@azstarnet.com>
Date: Thu, 06 Mar 1997 18:01:25 -0700
To: ss@tapr.org

Message-ID: <3.0.32.19970306175938.00736c08@pop.azstarnet.com>
Rendered body type: text/plain

>I think automatic power control is both a good idea and technically
>doable. I DO however have a problem with it being mandated by law
>when SS is the ONLY service in amateur radio in which it is being
>mandated. BTW, the Zilog hopper chip also supports power control.

My old copy of the FCC Ruklebook , part 97.313(a) reads "An amateur station must use the minimum transmitter power necessary to carry out the desired communications."

So, we're all obligated under law to do this. SS just requires it to be automatic. Since these are processor-controlled systems anyway, this is no big deal to do. We can spend a lot of energy arguing, or we can spend some energy implementing.

If you are against it, why not just write in your reply comments that 97.313 already mandates this so the requirement is redundant and it shouldn't be in the new SS regs.
>Yeap, any thoughts on commenting on the NPRM? Best way to solve that
>one would be to remove it (i.e. put the ID in the data stream) Or
>is it to late? I must have been asleep at the switch if I missed
>the above two points Lee raised.

Yep, that is what I would argue for. We did this successfully with packet years ago when CWID was a requirement. Our technical solution was going to be to have a central node tell everyone on channel to send CWID ...NOW and all stations would key up and do it then :-). Now, with cheap GPS, we can just do it on the GPS second interval that satisfies the FCC :-). Or, since we have power control mandated, we can just modulate the carrier above the low-threshold for SS communications and superimpose the CWID over the transmission (but if data is moving fast, we'll have to send a LONG file to last enough time to get the ID in :-).

Cheers,

Lyle

55. Re: [SS:1089] Re: SS Design

From: Jerry Normandin <jerryn@ici.net>
Date: Thu, 06 Mar 1997 21:23:09 -0500
To: ss@tapr.org
Message-ID: <331F7C0D.50A42891@ici.net>
Rendered body type: text/plain

Bob Lorenzini wrote:

>
> I agree with all those advocating an ethernet interface and would like
> to stress two points. It makes remoting the unit close to the ant much
> easier and all OS's can talk IP over ethernet. No need for those who do
> not run linux to learn unix.
>
> Bob - wd6dod
Just because I talk IP with my Linux box over the DOES NOT MEAN YOU MUS
AS WELL!!!!!!!!!!!!

AS LONG AS YOU FOLLOW the SAME IP Protocol you will hear
me!!!!!!!!!!!!!!!!!!!!
Stick to the standards... I don't care what interface you are using I
will hear you!!!!!!!!!!!!
So enough of the pissing contest already.

56. Re: [SS:1093] Re: SS Design

From: Jerry Normandin <jerryn@ici.net>
Date: Thu, 06 Mar 1997 21:27:51 -0500
To: ss@tapr.org
Message-ID: <331F7D27.1B9F5AAC@ici.net>
Rendered body type: text/plain

N5RG@aol.com wrote:

>
>
> > I would vote for a non-Ethernet solution. If Ethernet parts are that
> > cheap, someone could then design a board which provides the ethernet
> > interface and those that want it could get that interface card.
> >
>
> The latest JDR catalog lists Ethernet cards for \$29.95. Why not take

> advantage of them? They transmit packets.
>
> 73, Roy W7IDM, ex N5RG
You are correct my friend. many people don't realize how much power an ethernet card has.
I was just playing around one day and noticed if I connect the ground to the ground plane of the antennae and the signal to a 3" dipole I could actually transmit!!!!!!!!!!!!!!!!!!!!!!
Granted I only was able to get about 3 feet of range if we make a billateral amplifier we may be able to make a cheap cheap wireless card.
All we need to do is slap a Spectrum Analyzer on a NE2000 Card... check out the characteristics of the typical coaxial output.
By the way forgot to mention I had a 250hm load between the antennae and ground.

57. Re: ID Requirements

From: ssampson@othello.tinker.af.mil (Steve Sampson)
Date: Thu, 6 Mar 1997 20:30:05 -0600
To: ss@tapr.org
Message-ID: <9703070230.AA16718@othello.tinker.af.mil>
Rendered body type: text/plain

That's a good point about ID and power control. Is there anything illegal about sending the ID at -90 dBm??

Steve
"Power control--Good Good"
"Narrow Band ID--Bad Bad"

58. Re: [SS:1099] Re: SS Design

From: Ron Cole <rdcole@mindspring.com>
Date: Thu, 06 Mar 1997 20:31:04 -0600
To: ss@tapr.org
Message-ID: <331F7DE7.30A0@mindspring.com>
Rendered body type: text/plain

Fred M. Spinner wrote:

On Wed, 5 Mar 1997, Phil Karn wrote:

> >1) RS-232 IS speed limited. However an RS-422 interface for the data side
> >will allow a chip like the Zilog Z8700 to operate at up to 2Mbps. We have
> >not really talked about how fast we would expect this SS Box to be. It is
> >not much of a benefit to talk to the box at 10Mbps if it can not process
> >the data that quickly.
>
> And where do I get an RS-422 interface for my laptop? How much do they cost?

You can get converters from the balanced RS-422 to the RS-232.. but I think the lack of speed ability of the RS-232 on your laptop is the real problem...

All of the Serial ports RS-232 or RS-422 are just too slow. I think the only way to proceed is with a Ethernet port. Don't think in Packet Radio TNC or Phone Modem terms, think of a Network IP Router. That connects networks together. Via Radio.

Ether net technology is just too cheap no to use it. The target for a 1st generation SS radio should be something around 2Mbps.

Ron Cole
N5HYH

59. Re: [SS:1109] Re: SS Design

From: hbaker@netcom.com (Henry G. Baker)
Date: Thu, 6 Mar 1997 19:38:20 -0800 (PST)
To: ss@tapr.org
Cc: hbaker@netcom.com
Message-ID: <199703070338.TAA28254@netcom3.netcom.com>
Rendered body type: text/plain

> You are correct my friend. many people don't realize how much power an ethernet card has.
 > I was just playing around one day and noticed if I connect the ground to the ground plane
 > of the antennae and the signal to a 3" dipole I could actually transmit!!!!!!!!!!!!!!!!!!!!!!
 > Granted I only was able to get about 3 feet of range if we make a bilateral amplifier we may
 > be able to make a cheap cheap cheap wireless card.
 > All we need to do is slap a Spectrum Analyzer on a NE2000 Card... check out the characteristics
 > of the typical coaxial output.
 > By the way forgot to mention I had a 250hm load between the antennae and ground.

On a less whimsical note, what about a totally software SS scheme. The idea is to use a computer to generate the signals necessary -- perhaps on a parallel port, with perhaps a final cap and/or coil filter before putting it onto an antenna. Maybe one could only get a few MHz this way, and perhaps only a relatively low data rate, but the price would also be miniscule.

--
 Henry Baker
 www/ftp directory URL:
 ftp://ftp.netcom.com/pub/hb/hbaker/home.html

60. Re: [SS:1107] Re: WT Docket No. 97-12 - Hollow Victory?

From: Jeff King <jeff@mich.com>
 Date: Thu, 06 Mar 1997 23:26:11 -0500
 To: ss@tapr.org
 Message-ID: <2.2.32.19970307042611.006ele18@mail.mich.com>
 Rendered body type: text/plain

At 07:04 PM 3/6/97 -0600, Lyle Johnson wrote:

>
 >>I think automatic power control is both a good idea and technically doable. I DO however have a problem with it being mandated by law
 >>when SS is the ONLY service in amateur radio in which it is being mandated. BTW, the Zilog hopper chip also supports power control.
 >
 >My old copy of the FCC Ruklebook , part 97.313(a) reads "An amateur station must use the minimum transmitter power necessary to carry out the desired communications."
 >
 >So, we're all obligated under law to do this. SS just requires it to be automatic. Since these are processor-controlled systems anyway, this is no big deal to do. We can spend a lot of energy arguing, or we can spend some energy implementing.

Who is arguing? We already agree power control is a good idea.

You miss my point completely however. Why do you support a specific rule for automatic power control for SS systems and not for narrowband systems? This sets a precedent of holding SS users to a higher standard than narrowband users. By your own admission, automatic power control on SS (or any mode for that matter) is easy.... why do we need government regulations to tell us to do something that simply makes sense? Do the clover users on HF (which you earlier mentioned) need government regulations to implement power control?

My point is (and I think most in the SS-STA would agree) is that spread spectrum is a legitimate amateur RF emission. I've (almost) exclusively operated spread spectrum for the last 2 years. In fact, this is how this message is getting to you now. I'd not have ANY objection to some form of automatic power control for amateur radio emissions... I do have a problem of SS being singled out as the only emission that this is required for. I think this sets a precedent we don't want to agree to.

If there is some sort of long term plan here to introduce automatic power control to amateur radio, let me know as I'm not aware of it. Remember, narrowband emissions can easily wipe out DSSS signals. Power control for narrowband emitters would help SS out also.

>
 >If you are against it, why not just write in your reply comments that 97.313 already mandates this so the requirement is redundant and it shouldn't be in the new SS regs.

As I said, it should either be in the AMATEUR regs for all emissions or not at all. I see absolutely no reason why Spread Spectrum should be singled out in this regard. I'd like to get some feedback from this group first, but yes, I do plan on commenting.

Thanks

-Jeff wb8wka

"Power control for ALL amateur emissions --Good Good"
"Narrow Band ID--Bad Bad"

61. Ethernet Interface

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Fri, 07 Mar 1997 06:59:26 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970307115926.003e0bdc@mindspring.com>
Rendered body type: text/plain

There seems to be plenty of interest in having a box that looks like an IP router, connected by twisted pair ethernet.

Such a box could certainly be based on an ISA architecture computer with a plug-in ethernet card and radio interfaced by any number of means including ISA or PCMCIA plug-in, parallel port or serial. As a matter of fact many of the commercial WLAN access points are just that, a computer with ethernet and radio cards.

However, I don't think Phil wants to carry a computer around to hook to his laptop and I don't want to mount one on my tower (if I even had one). So what we want to look at is something like the ISDN routers that are available now. A desktop modem sized box with an IP router front end and in our case, an RF modem on the back end.

I hope that when Phil started talking about using ethernet he was visualizing a router, and not just writing our own drivers to send data packets over the ethernet wire. If one objective is to operate in a Windows environment on the host, it would seem like to me that any approach that required something like a shim below the Winsock level would cause the radio to not be able to coexist in a Windows box with standard networking to other ethernet hosts.

Does anybody around have any knowledge of the technology used to implement the IP router function in devices such as the Ascend ISDN router? Is there a chip set?

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
<http://www.mindspring.com/~lfry/part15.htm>

62. Confused? (I am)

From: zeus@myth.demon.co.uk (Mike Cowgill)
Date: Fri, 07 Mar 1997 12:56:53 GMT
To: ss@tapr.org
Message-ID: <2165@myth.demon.co.uk>
Rendered body type: text/plain

I've obviously not been paying enough attention (nothing new there) because I am confused over this Ethernet thing. Is the idea just to use Ethernet as a direct data source/sink to/from the keyer and correlator, or just to use it as a data pipe to a controller?

If it is a direct source then there are obvious problems with varying data rate etc. If it is as a data pipe, then isn't this a bit premature? The usual way of developing this sort of stuff (or at least the way I developed stuff like GPS/Glonass receivers) is using a PC/AT breadboard for digital control (an 8255 or whatever) and DMA data pump, moving over to a local processor control (and arguments about data feed) when you get the basic system working.

Mike

P.S. How about a SCSI feed?

63. Re: [SS:1108] Re: SS Design

From: Bob Lorenzini <hwm@netcom.com>
Date: Fri, 7 Mar 1997 08:09:05 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970307075059.133B-100000@mm.wd6dod.ampr.org>
Rendered body type: text/plain

On Thu, 6 Mar 1997, Jerry Normandin wrote:

> Bob Lorenzini wrote:
> >
> > I agree with all those advocating an ethernet interface and would like
> > to stress two points. It makes remoting the unit close to the ant much
> > easier and all OS's can talk IP over ethernet. No need for those who do
> > not run linux to learn unix.
> >
> > Bob - wd6dod
> Just because I talk IP with my Linux box over the DOES NOT MEAN YOU MUS
> AS WELL!!!!!!!!!!!!
>
> AS LONG AS YOU FOLLOW the SAME IP Protocol you will hear
> me!!!!!!!!!!!!!!!!!!!!
> Stick to the standards... I don't care what interface you are using I
> will hear you!!!!!!!!!!!!
> So enough of the pissing contest allready.

I think you misunderstood what I was trying to say or perhaps I did not make myself clear. I have nothing against linux. If you had checked my header you would have noticed that it came from linux. In fact it was sent over RF between two linux boxes. Much of the hostility toward linux comes from the fact that we linux users in our enthusiasm over a great operating system become so evangelical that we offend others. Rereading your comments, I'am not sure what your complaint is. My point was that a ss-box with an ethernet interface would talk to any OS. I suspect that many of those who are interested in SS don't want to learn unix system administration in order to experiment with high speed networking.

Bob - wd6dod

64. Re: [SS:1115] Confused? (I am too!!)

From: RLANIER@mailb.harris.com (RLANIER)
Date: Fri, 7 Mar 1997 11:26:11 -0500
To: ss@tapr.org
Message-ID: <32042280@mailb.harris.com>
Rendered body type: text/plain

I thought the whole idea of the TAPR/SS list/whoever SS
modem/radio/whatever was to develop a spread spectrum device that
would be a launching platform for development in other areas, similar
to the DSP-93 device.

We also seem to be focusing on the details of one aspect of the
device. This is not a good method for top-down design. We have to
develop a set of requirements/features and then go from there.
However, the requirements/features need to be general, not specific,
but flexible enough to allow experimentation by a large group of hams.
That is why I keep emphasizing a modular design. If designed
correctly, the SS device can be whatever you want it to be, with the
correct modules in place.

Arguing about ethernet/rs-232 isn't moving us any closer to our goal,
which I thought was to develop a working SS device within the given
timeframe. We'll never meet that at the rate we are going.

Tony KE4ATO

Reply Separator

Subject: [SS:1115] Confused? (I am)
Author: ss@tapr.org at smtp
Date: 3/7/97 7:54 AM

I've obviously not been paying enough attention (nothing new there) because I am confused over this Ethernet thing. Is the idea just to use Ethernet as a direct data source/sink to/from the keyer and correlator, or just to use it as a data pipe to a controller?

If it is a direct source then there are obvious problems with varying data

rate etc. If it is as a data pipe, then isn't this a bit premature? The usual way of developing this sort of stuff (or at least the way I developed stuff like GPS/Glonass receivers) is using a PC/AT breadboard for digital control (an 8255 or whatever) and DMA data pump, moving over to a local processor control (and arguments about data feed) when you get the basic system working.

Mike

P.S. How about a SCSI feed?

65. Re: [SS:1114] Ethernet Interface

From: darnell@binmedia.com (Darnell Gadberry)
Date: Fri, 7 Mar 97 08:49:36 -0800
To: <ss@tapr.org>
Message-ID: <19970307164256022.AAA45@[206.117.173.2]>
Rendered body type: text/plain

On 3/7/97 Lee W. Fry Wrote:

>There seems to be plenty of interest in having a box that looks like an IP
>router, connected by twisted pair ethernet.
>
>Such a box could certainly be based on an ISA architecture computer with a
>plug-in ethernet card and radio interfaced by any number of means including
>ISA or PCMCIA plug-in, parallel port or serial. As a matter of fact many of
>the commercial WLAN access points are just that, a computer with ethernet
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>
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>laptop and I don't want to mount one on my tower (if I even had one). So
>what we want to look at is something like the ISDN routers that are
>available now. A desktop modem sized box with an IP router front end and in
>our case, an RF modem on the back end.
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>I hope that when Phil started talking about using ethernet he was
>visualizing a router, and not just writing our own drivers to send data
>packets over the ethernet wire. If one objective is to operate in a Windows
>environment on the host, it would seem like to me that any approach that
>required something like a shim below the Winsock level would cause the radio
>to not be able to coexist in a Windows box with standard networking to other
>ethernet hosts.
>
>Does anybody around have any knowledge of the technology used to implement
>the IP router function in devices such as the Ascend ISDN router? Is there
>a chip set?
>

I am sending this message from a PowerMacintosh 7600 connected to my home LAN which is connected to the MCI T1 Internet connection in my office via a Pipeline 75 ISDN router.

The Ascend Pipeline family of ISDN routers (P25, P50, P75, P130) are based on Motorola MC68302 or MC68EN360 microprocessors. Both devices are basically 68020 CPU cores with an enhanced RISC multichannel communications co-processor. As a matter of fact, most current IP routers that cost less than \$5,000 are based on the MC68EN360. (Except products from Cisco.)

Several years ago, the U.S. Army contracted a company called OAR systems to produce a Real Time operating system with TCP/IP support. The result of that contract was a product called RTEMS. RTEMS supports a wide variety of processors and comes with a complete GNU C development environment. The Army makes RTEMS available to the public FREE OF CHARGE as part of a DOD sponsored technology exchange program. I believe that RTEMS would serve quite nicely as the software core for a simple IP router. RTEMS supports development in C as well as ADA.

You can find more details on RTEMS at:

<http://lancelot.gcs.redstone.army.mil/rtems.html>

The RTEMS C language documentation can be downloaded from:

ftp://lancelot.gcs.redstone.army.mil/pub/rtems/releases/current/c/rtems-c_d oc.tgz

I like to would propose the development of a standard TAPR CPU platform with RTEMS support and RIP routing added to the RTEMS kernel. The

hardware could be based upon either the MC68EN302 or MC68EN360 CPU. I would be willing to work on porting the kernel or helping develop a prototype hardware implementation.

Thoughts?

- darnell gadberry ke6uc1
Phonica / binaryMedia Communications
DSP Applications, Data Communications and Embedded control stuff
darnell@binmedia.com

66. Confused? (So am I !!)

From: RLANIER@mailb.harris.com (RLANIER)
Date: Fri, 7 Mar 1997 14:04:06 -0500
To: ss@tapr.org
Message-ID: <32069370@mailb.harris.com>
Rendered body type: text/plain

I thought the whole idea of the TAPR/SS list/whoever SS
modem/radio/whatever was to develop a spread spectrum device that
would be a launching platform for development in other areas, similar
to the DSP-93 device.

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device. This is not a good method for top-down design. We have to
develop a set of requirements/features and then go from there.
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which I thought was to develop a working SS device within the given
timeframe. We'll never meet that at the rate we are going.

Tony KE4ATO

67. RE: 1113] Re: WT Docket No. 97-12 - Hollow Victory?

From: "Rochford, Richard E." <rero@cbmsmail.cb.lucent.com>
Date: 7 Mar 97 16:02:00 -0500
To: "ss" <ss@tapr.org>
Message-ID: <332082B7@cbmsmail.cb.lucent.com>
Rendered body type: text/plain

Power control on any SS system is critical. This especially true for
systems using multiple sequences on the same carrier. I feel power
control for SS systems is implied.

The technology exists today to make power control possible for other
modes but it is very difficult to go back and make this a requirement.

The killer is the ID requirement. The process of identifying would
generate more interference than the SS signals themselves. There has to
be a way around this. Perhaps just logging the SS information would be
enough.

RE Rochford WB7RPH

At 07:04 PM 3/6/97 -0600, Lyle Johnson wrote:

>
>>I think automatic power control is both a good idea and technically
>>doable. I DO however have a problem with it being mandated by law
>>when SS is the ONLY service in amateur radio in which it is being
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>must use the minimum transmitter power necessary to carry out the
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>communications."
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>So, we're all obligated under law to do this. SS just requires it to be
>automatic. Since these are processor-controlled systems anyway, this is
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>big deal to do. We can spend a lot of energy arguing, or we can spend
some

>energy implementing.

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Thanks

-Jeff wb8wka

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"Narrow Band ID--Bad Bad"

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RE Rochford WB7RPH

68. RE: 1097] Re: WT Docket No. 97-12 - Holl

From: "Bloom, Jon, KE3Z" <jbloom@arrl.org>
Date: Fri, 7 Mar 1997 17:00:00 -0500
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <m0w37hu-0004rHC@mgate.arrl.org>
Rendered body type: text/plain

> From: Jeff King[SMTP:jeff@mich.com]
> At 08:49 AM 3/6/97 -0600, Lyle Johnson wrote:
> >Lee,
> >
> >>The killers are automatic transmitter power control...
> >>...As far as I know, none of the chipset solutions currently
available for SS
> >>applications in 900MHz or 2.4 GHz can support these requirements.
> >
> >>The Harris PRISM chipset has an ADC that measures incoming signals and
this

>
> I think automatic power control is both a good idea and technically
> doable. I DO however have a problem with it being mandated by law
> when SS is the ONLY service in amateur radio in which it is being
> mandated. BTW, the Zilog hopper chip also supports power control.
>
> So the ARRL is saying that amateurs that run SS are to stupid to use
> the the minimum power required to make communications? (as required
> by law).

No, I think what is being said is that adding automatic power control to still-to-be-designed SS systems is technically feasible, wouldn't be particularly burdensome, and is a Good Thing. Also, a vastly overpowered SS system has greater potential for causing harmful interference to existing users than a vastly overpowered narrowband system; thus it's more important to maintain power control.

If you feel that adding automatic power control to SS designs would be an excessive burden, is technically infeasible or is a Bad Thing, by all means, make your point in written comments to the FCC. That's what the comment period is for.

> So all those DX'ers that are running kilowatts don't need
> automatic power control? Or the local 2metre repeater that is running
> 400 watts shouldn't use automatic power control?
>
> Automatic power control is technically possible for almost every
> modulation mode. I have a serious problem with SS being singled
> out by the ARRL, in particular with legal regulations.

Technically possible, perhaps, but quite burdensome for old-fashioned narrowband voice systems. And requiring automatic power control for such systems would mean retrofitting a *lot* of existing equipment. Maybe if amateurs were starting with a blank sheet of paper for those modes, like they are for SS, automatic power control *would* be a requirement. Who knows?

> >Anyway, one can look at BER or retries or ??? and then set the power
level
> >by the processor that must be embedded in this widget anyhow.
Automatic
> >power control isn't a big deal IMHO -- heck, even the HF guys use it
> >(clover and the like) :-)
>
> Yeap, they use automatic power control because it makes sense. And
gosh,
> they don't even need the government telling them to do it! I guess
those
> spread spectrum folks are just to stupid to realize the advantages of
> power control. Gotta get the government involved to keep the threat of
> SS to amateur radio under control.

There is nothing in these proposed rules that implies anything about the intelligence, morals or habits of SS proponents or anyone else. Trying to cast the NPRM in that light is just muddying the waters. If you have solid technical or operational arguments against (or for) aspects of the NPRM, please do comment to the FCC.

Jon
--
Jon Bloom, KE3Z
jbloom@arrl.org

69. Re: [SS:1090] RE: 1085] RE: 1080] Re: SS Design Interfaces

From: dkelly@hiwaay.net
Date: Thu, 06 Mar 1997 21:20:06 -0600
To: ss@tapr.org
Message-ID: <199703070320.VAA11693@nexgen.hiwaay.net>
Rendered body type: text/plain

Rochford, Richard E. writes:

>
> If you are looking for faster data rates, (digital including speech,
> text, video etc.), ethernet is a way to go. However, this implies there
> is some other interface, RS232 etc. i.e. a console port, which is needed
> to administer the ethernet interface.
>
> I currently work on a product with an ethernet interface and no console
> port, requiring us to use a default IP address and come up with an

> elaborate method of burning the MAC address.
>
> Obtaining and assigning MAC addresses is an other administrative chore
> which has to be centralized somewhere for a project like this.

I've thought about this a lot in the past and concluded about the cheapest easiest quickest way to do ethernet on a design like this is to adopt something like an NE2000 ISA ethernet card as your "ethernet chip". At about \$20 each in onesies you solve lots of problems. Such as registering a block of ethernet addresses. And the regulatory issues for non-amateur gear.

But the problem is once one decides to put an ISA card in there somewhere, somebody pops up and insists, "lets do it all on a PC and use *NOS".

--

David Kelly N4HHE, dkelly@hiwaay.net

=====

The human mind ordinarily operates at only ten percent of its capacity -- the rest is overhead for the operating system.

70. Power control with Part 15 gear

From: Jeff King <jeff@mich.com>
Date: Fri, 07 Mar 1997 22:32:22 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970308033222.0071663c@mail.mich.com>
Rendered body type: text/plain

Given some thought to the requirement for power control within the new SS NPRM. Specifically, the Part 15 SS equipment I now can operate under the TAPR SS-STA at higher power levels but won't be able to if the NPRM goes through. I'm sure most in this group are in the same boat as the majority of Part 15 equipment doesn't implement power control.

The FreeWave is the most well suited for power control as it can both measure signal strength, noise level have 10 levels of transmit power. The two problems are that you only can control the FreeWave "inband" via the existing RS-232 line (after hitting reset!) and the second (biggest) problem is they don't appear to want to work with the amateur community.

The other unit I've done some work with is the NCR/ATT/Lucent WaveLan board. With the Linux Driver you can pull some interesting stats while the board is working covering signal strength, noise and I believe S/N. However, to the best of my knowledge, you can't do power control with it. OK if you want to run less than 1 watt but what if you wanted to run up to 10 watts or so with a antenna amplifier. This has the added benefit of allowing you to get away with higher loss cables like LMR-400.

Had a idea and wanted to run it by the group. What if you developed a remote power amp that you could control the gain? Many 900mhz bricks have a external pin to set gain level. A simple micro controller with a DAC converter could drive this pin and the LINUX box could talk to the microcontroller over a serial link. Not the most elegant solution but would allow you to use existing WaveLan boards with amps under the NPRM. The MicroController code would be trivial (One of the things I do for a living).

-Jeff wb8wka

71. Re: [SS:1121] RE: 1097] Re: WT Docket No. 97-12 - Holl

From: Jeff King <jeff@mich.com>
Date: Sat, 08 Mar 1997 00:12:20 -0500
To: ss@tapr.org, ss-sta@tapr.org
Message-ID: <2.2.32.19970308051220.008c0db4@mail.mich.com>
Rendered body type: text/plain

At 04:01 PM 3/7/97 -0600, Bloom, Jon, KE3Z wrote:

>

>

>No, I think what is being said is that adding automatic power control to >still-to-be-designed SS systems is technically feasible, wouldn't be >particularly burdensome, and is a Good Thing.

OK. That's fair enough. What about the already existing Part 15 equipment that exists and that some of us are currently using under the TAPR-STA?

Will we be grandfathered?

>Also, a vastly overpowered
>SS system has greater potential for causing harmful interference to
>existing users than a vastly overpowered narrowband system; thus it's
>more important to maintain power control.

So far we don't disagree. A vastly overpowered narrowband system can cause quite a bit of interference to a DSSS system, especially with many of the low process gain chipsets that are on the market.

BTW, speaking of overpowered, the rules set the limit at 100watts which is only 20db over the non-automatic power control limit of 1 watt. And I'd hazard to guess not very many will run much over 10watts on 900mhz and above as it becomes quite costly. So we really are only talking 10db of protection. Seems to me power control should apply all the way down to microwatts if its really going to be effective.

Earlier I Said:

>> From: Jeff King
>> I think automatic power control is both a good idea and technically
>> doable. I DO however have a problem with it being mandated by law
>> when SS is the ONLY service in amateur radio in which it is being
>> mandated. BTW, the Zilog hopper chip also supports power control.
>>

Then you said:

>
>If you feel that adding automatic power control to SS designs would be an
>excessive burden, is technically infeasible or is a Bad Thing, by all
>means, make your point in written comments to the FCC. That's what the
>comment period is for.

Read what I already said. I don't think its a excessive burden at all to add power control to ANY equipment. I just think its very hypocritical to only require it on amateur SS equipment. Either RF power control is a good idea for all of amateur radio, or its not. There is no technical middle ground here.

>
>> So all those DX'ers that are running kilowatts don't need
>> automatic power control? Or the local 2metre repeater that is running
>> 400 watts shouldn't use automatic power control?
>>
>> Automatic power control is technically possible for almost every
>> modulation mode. I have a serious problem with SS being singled
>> out by the ARRL, in particular with legal regulations.
>
>Technically possible, perhaps, but quite burdensome for old-fashioned
>narrowband voice systems. And requiring automatic power control for such
>systems would mean retrofitting a *lot* of existing equipment. Maybe if
>amateurs were starting with a blank sheet of paper for those modes, like
>they are for SS, automatic power control *would* be a requirement. Who
>knows?

Hmmmm... "quite burdensome for old-fashioned narrowband voice systems"? So what?! This is SUPPOSED to be a technical service. Power control either makes sense or it doesn't. The mode shouldn't matter at all. Technically, I don't care if its a burden or not. With this kind of logic we'd still be allowing spark on the bands.

Let me steal some of your words and make a proposal.....

>"No, I think what is being said is that adding automatic power
>control to still-to-be-designed SS systems"

(^delete SS systems, insert: ^NARROWBAND systems)

>"is technically feasible, wouldn't be particularly burdensome,
>and is a Good Thing."

Note I replaced Spread Spectrum with NARROWBAND. Since you wish to mandate automatic power control for new spread spectrum designs, how about we mandate power control for NEW narrowband radios? That will shut me up. We can grandfather the existing narrowband users.

>There is nothing in these proposed rules that implies anything about the

>intelligence, morals or habits of SS proponents or anyone else. Trying to
>cast the NPRM in that light is just muddying the waters. If you have
>solid technical or operational arguments against (or for) aspects of the
>NPRM, please do comment to the FCC.
>
>Jon
> --
>Jon Bloom, KE3Z
>jbloom@arrl.org

Jon, I'm sure I'm coming off like a Bull in a China Shop, but I think the NPRM is hypocritical to require power control for SS users while not at least suggesting power control for other users of the band (be they narrowband amateur or Part 15 SS). I by and large support the NPRM with one exception, I think for fixed point to point links, where the signal strength is constant 99%+ of the time, the provisions of automatic power control should be waved AS LONG AS the power is MANUALLY set to conform with the NPRM formula. This would allow existing Part 15 designs to be leveraged into Part 97 operation at higher (if need be) power levels. However, for ad hoc SS networks, I fully support and embrace automatic power control.

Please don't have the illusion that "if we build it, they will come". How many 219-220mhz radios exist?? We HAVE TO BE ABLE to leverage existing Part 15 radios into our service to make this work. The movers and shakers at first are going to use these hopped up Part 15 radios to do point to point links. We want them to run these radios under Part 97 rules, not Part 15 rules. There has to be some latitude in the rules for point to point links.... possibly a solution for compliance would be to either require automatic power control OR require the link be coordinated. In case you don't know it, the majority of Part 15 radios don't allow automatic power control.

One question, I do have some comments regarding aspects of the NPRM I'd like to make to the FCC. However, do I risk upsetting the chance of the NPRM going through if I do? I can be (believe it or not!) somewhat pragmatic and I think what is offered, is quite good. I'd like to see power control phased into all of amateur radio as well as Part 15 devices we share the bands with. I don't want to upset the apple cart by suggesting this in comments on the NPRM.

Regards,

-Jeff King wb8wka
Via a 902-928mhz frequency hopping 173KBPS spread spectrum link

Regards,

| Jeff King Aero Data Systems |
| jeff@mich.com P.O. Box 510895 |
| (810)471-1787 Livonia, MI 48151 |
F(810)471-0279 United States

72. Re: [SS:1118] Re: Ethernet Interface

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Sat, 08 Mar 1997 07:13:17 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970308121317.0036c180@mindspring.com>
Rendered body type: text/plain

At 10:51 AM 3/7/97 -0600, darnell gadberry ke6ucl wrote in [SS:1118]:

>
>I like to would propose the development of a standard TAPR CPU platform
>with RTEMS support and RIP routing added to the RTEMS kernel. The
>hardware could be based upon either the MC68EN302 or MC68EN360 CPU. I
>would be willing to work on porting the kernel or helping develop a
>prototype hardware implementation.
>
>
>Thoughts?
>

Thanks. So far, the only suggestion on an embedded controller. I can't believe that with all the talk of TCP/IP/HTTP everywhere, including your TV, microwave oven and maybe even your HF rig that such a product won't drop out of the commercial sky.

I poked around in comp.realtime via Deja News and found a fair amount of discussion about TCP/IP stacks for embedded controllers. It looks like there were people working on a RTEMS stack last fall. Also there was an interesting suggestion on using the AMD Lance ethernet controller behind a non-EN 68C.

Is there a version of 68C with an imbedded PCI bus? How about the suggestion from David Kelly N4HHE, dkelly@hiwaay.net in [SS:1122] to use a off the shelf ethernet card? The newer PCI ethernet cards are small enough to use as a daughter card, especially with the bracket stripped off.

Anyway, it sounds like an embedded ethernet controller is a project in itself. Also, there might be interest from other communities.

Just another random thought: The controller could also implement in-band control for managing transmit power and station ID. Then we would need SNMP also.

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
<http://www.mindspring.com/~lfry/part15.htm>

73. Re: [SS:1125] Re: Ethernet Interface

From: John Koster <w9ddd@tapr.org>
Date: Sat, 8 Mar 1997 07:43:37 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.BSI.3.91.970308073743.8264A-100000@tapr.org>
Rendered body type: text/plain

On Sat, 8 Mar 1997, Lee W. Fry wrote:

> At 10:51 AM 3/7/97 -0600, darnell gadberry ke6ucl wrote in [SS:1118]:
> >
> >I like to would propose the development of a standard TAPR CPU platform
> >with RTEMS support and RIP routing added to the RTEMS kernel. The

stuff deleted

>
> Is there a version of 68C with an imbedded PCI bus? How about the suggestion
> from David Kelly N4HHE, dkelly@hiwaay.net in [SS:1122] to use a off the shelf
> ethernet card? The newer PCI ethernet cards are small enough to use as a
> daughter card, especially with the bracket stripped off.
>

As a matter of fact I saw an advert. the other day for an evaluation board for the Coldfire from Motorola that did exactly that. (Well almost, it looked like an ISA ethernet card, not PCI) I don't have the details yet, but it appeared there was also a asynch. serial port as well.

>
>
the rest deleted

John, W9DDD@tapr.org

74. Preliminary Design

From: cape.net@surfergirl.spacey.net
Date: Sat, 08 Mar 1997 12:50:43 -0500 (Eastern Standard Time)
To: ss@tapr.org
Message-ID: <199703081750.MAA00016@surfergirl.spacey.net>
Rendered body type: text/plain

I have come up with a preliminary design of the SS box. I have tried to make it as generic as possible, without including un-necessary details. My idea is to get an idea of the overall design and how the pieces of the puzzle will fit together. I don't won't to lose sight of the forest for the trees, if you know what I mean.

```
\/  
|  
|      +-----+   +-----+   +-----+  
|      | RF |<-->| SS |<-->| DATA |<--- Voice  
+-----+ Section | Section | Interface |<--- Ethernet  
|      |      |      |      |      |<--- RS-232/RS-422  
|      +-----+   +-----+   +-----+
```

Obviously, there is more to the system than this, but it is a start. I feel that with a system such as this, all persons interested in the design can be happy. The only 'grey' area is the interfacing between the SS and DATA Interface sections. How is the data transfer going to be handled? I feel that the SS section should have a constant data rate. Only the data rates to and from the DATA Interface section should be varied.

The RF section could have all circuitry for translating the data into the RF spectrum and would also contain the interfacing to the antennae. It would also have the IF circuitry, automatic power control interfacing (to the SS section), AGC, and other stuff I can't think of right now. The SS section would do spreading/de-spreading, modulation/demodulation, FEC, PN generation, DS-FH-hybrid control (to RF section?). The DATA Interface would contain rate buffers (FIFOs) for data transfer (for slow mode interfaces such as rs-232), ADCs for voice, interfacing for a front panel (if desired).

There is a great deal of planning that would need to go into a project of this magnitude. The above is a starting point. The only thing left to do is decide on how the major blocks are going to connect to each other.

Tony KE4ATO

75. Re: [SS:1125] Re: Ethernet Interface

From: darnell@binmedia.com (Darnell Gadberry)
Date: Sat, 8 Mar 97 10:04:25 -0800
To: <ss@tapr.org>
Message-ID: <19970308175746606.AAA66@[206.117.173.2]>
Rendered body type: text/plain

On 3/8/97 at 4:14 AM Lee W. Fry wrote:

```
>
>At 10:51 AM 3/7/97 -0600, darnell gadberry ke6uc1 wrote in [SS:1118]:
>>
>>I like to would propose the development of a standard TAPR CPU platform
>>with RTEMS support and RIP routing added to the RTEMS kernel. The
>>hardware could be based upon either the MC68EN302 or MC68EN360 CPU. I
>>would be willing to work on porting the kernel or helping develop a
>>prototype hardware implementation.
>>
>
>Thanks. So far, the only suggestion on an embedded controller. I can't
>believe that with all the talk of TCP/IP/HTTP everywhere, including your TV,
>microwave oven and maybe even your HF rig that such a product won't drop out
>of the commercial sky.
```

We have used VxWorks, QNX and pSOS in our commercial embedded designs. Each of these Real-Time operating systems has a COMPLETE TCP/IP implementation. Adding AX.25 and RIP routing would be a VERY simple task. Additionally, each of three of the OSs that I just mentioned offer an embedded HTTP server as part of their runtime package. Unfortunately, we paid \$14,000 for our VxWorks development system and approximately \$28 per unit for the runtime license. So that solution might not be the most cost effective. I strongly urge all of the software savvy folks on this thread to take a close look at RTEMS. I believe that I would work very nicely as the core OS for virtually any communications related box that we might want to implement.

```
>I poked around in comp.realtime via Deja News and found a fair amount of
>discussion about TCP/IP stacks for embedded controllers. It looks like
>there were people working on a RTEMS stack last fall.
```

There is a guy in my office who has a copy of the RTEMS TCP/IP stack. I will try and get my hands on the code, take a look at the implementation and report back on what I find. I will be putting an RTEMS page up on my site some time next week.

```
>Also there was an interesting suggestion on using the AMD Lance ethernet
controller behind a >non-EN 68C.
```

The Lance is a really messy, low-performance, first-generation Ethernet controller. Certainly not something that I would use for a current design.

```
>Is there a version of 68C with an imbedded PCI bus?
```

No.

>How about the suggestion from David Kelly N4HHE, dkelly@hiwaay.net in [SS:1122] to use a off >the shelf ethernet card?

Why. Most current generation ethernet controller chips will talk to an Intel 80XXX or Motorola MC68XXX CPU with little or no glue logic.

>The newer PCI ethernet cards are small enough to use as a daughter card, especially with the bracket stripped off.

See previous comment.

Ethernet chips are now REALLY cheap. The single piece board price of the Fujitsu MB8XXX 10Base-T controller is around \$13.50. Obviously, if we go to a distributor and make a low 1000's purchase commitment that price could drop considerably. Add another \$8 bucks for the requisite transformer and other 10Base-T interface junk and you are done.

Further, ISA is MUCH easier to implement in an embedded design. For the 68K family it typically takes a pair of 16V8 GALs and a couple of bi-directional bus buffers. If you use one of the embedded 80XX86 family parts you get the ISA bus for free. PCI has some VERY stringent timing requirements which make it very costly to implement in on a small scale. And besides, at the actual speeds we are discussing adding a PCI bus would be like killing a bug with a bazooka.

>
>Anyway, it sounds like an embedded ethernet controller is a project in itself. Also, there might be interest from other communities.
>
>Just another random thought: The controller could also implement in-band control for managing transmit power and station ID. Then we would need SNMP also.

There is a complete public domain SNMP MIB and agent package available for free with the FreeBSD source package from U.C. Berkeley.

Context switch.

This has been a fairly interesting discussion. However, I think that we have become mired in the minute details of the implementation. What we should do is to create a 5,000 foot level specification of what the box should do and then worry about the implementation details once we have figured out what we really want to accomplish.

Just a thought...

- darnell gadberry ke6uc1
Phonica / binaryMedia
darnell@binmedia.com

76. Re: [SS:1086] RE: 1081] Re: SS Design

From: stannard@alaska.net (John Stannard - KL7JL)
Date: Sat, 08 Mar 97 12:28:03 -0900
To: ss@tapr.org
Message-ID: <199703082140.MAA23505@calvino.alaska.net>
Rendered body type: text/plain

In
<c=US%a=_%p=Acxiom_Corporati%l=P0-CONWAY-1-970306142218Z-18125@po-conway-1.conway.acxiom.com>,
on 03/06/97
at 08:27 08, efbrya - Eric Bryan <efbrya@acxiom.com> said:

>>>I say we should forget about building a radio that can be used to prove that
>>>SS can share 6M, 2M, 220, and 440 spectrum with existing users, or make more
>>>efficient use of existing spectrum. We addressed that in our STA, but no

> I am interested in these lower freq. just to get greater range with out
>having
>to find places to stick repeaters all over the countryside. I want to do
>200 mile hops at a minimum.

Hear, hear!

Even some of us "appliance operators" have an interest in USING Spread Spectrum, and except for the "major" cities in Alaska, the microwave bands

are not going to make it up here in the Bush for networking. My CLOSEST tcp/ip neighbor is 135 miles away in Kodiak--across the water. We currently have a packet link on 6m--soon a voice link as well. I'd love to see something high-speed between Homer and Kodiak, but in previous tests, 2m and 440 can't make the trip.

Topology has a great influence on what we do here in Alaska...try to not leave us out when considering options.

Lower frequencies are also easier to find parts for (at
>least it seems
>that way to me).

>Eric Bryan
>efbrya@acxiom.com

>>
>>

73, John

--

stannard@alaska.net (John Stannard - KL7JL) Reg. MR/2ICE User #524
I've been telling them for years: "SCSI is *not* SCUZZY, it's SEXY!"
Disclaimer: Appliance Operator; using packet since 1986, using tcp/ip since 1987...not EVEN a
programmer. :-(

77. Re: [SS:1129] RE: 1081] Re: SS Design

From: wb9mjn@wb9mjn.ampr.org
Date: Sat, 08 Mar 97 18:13:33 UTC
To: ss@tapr.org
Message-ID: <13094@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi John,

The longest distance working packet link that we have had on the air here in the Chicagoland area was on 1.2 ghz. It was 76 miles. It was dead solid.

One antenna was at 1200 feet agl, the other was at around 500 agl. Where Ground level (gl) was actually the middle of Lake Michigan.

Clearly, with a mountain/valley altitude variation , typically allot more than 1200 feet, ur going to be able to go allot farther.

So don t count out microwaves, simply because of range. Due to the physics of the problem microwaves may just be what ur looking for!

Below 1 Ghz, its tuff to get a first fresnel clearance. A grazing path incurs about 20 dB extra path loss than a free space path. A First Fresnel clearance path has 6 dB gain (that s right, 6 dB LESS loss) than free space. The high the frequency, the less the required clearance of the center of the path, to have a first fresnel path. Indeed, on 220, the first fresnel clearance between 2 450 foot high antennas, over smooth earth, is only about 14 miles. That is, the distance for first fresnel clearance. On 10 Ghz, a 30 mile path only needs a small fraction of that clearance (on the order of 30 feet).

Its this magic , which lets u run flea power on microwaves, and cover tremendous distances. Combine this with antenna gain, and u can run megabaud at tremendous distances!

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn@wb9mjn.ampr.org@uugate.aim.utah.edu

78. Modular SS

From: zeus@myth.demon.co.uk (Mike Cowgill)
Date: Sun, 09 Mar 1997 01:34:09 GMT
To: ss@tapr.org
Message-ID: <2166@myth.demon.co.uk>
Rendered body type: text/plain

After seeing various OS's mentioned, how come nobody has seized on to Linux and is running with it? It is free, has full network support (TCP/IP at kernel level) and has an embedded version which is actively being maintained. It also runs off both 80x86 and 680x0 should you desire it. It would also mean that you can develop the control software and hardware on your usual PC, leaving the niceties of communications until the difficult stuff is done.

When all is finished (are they ever?) you build a small diskless PC (plenty of cheap support chipsets), re-compile it and burn it on to EEPROM. Should you desire it it would be trivial to move the interface to 100Mb/s, Ultra and Fast SCSI or whatever, the drivers are already there written, as is audio and video compression, all the usual Internet higher level support (a modem with native X-windows interface...) If you wanted to integrate Codecs for analogue use then fair enough, but I would prefer to concentrate on a pure digital design in the first instance.

Mike.

79. Re: [SS:1130] RE: 1081] Re: SS Design

From: Jerry Normandin <jerryn@ici.net>
Date: Sat, 08 Mar 1997 22:03:00 -0500
To: ss@tapr.org
Message-ID: <33222864.685B20A4@ici.net>
Rendered body type: text/plain

Jerry Normandin Replies:

At last,

someone with a post that knows what they are talking about!

wb9mjn@wb9mjn.ampr.org wrote:

>
> Hi John,
>
> The longest distance working packet link that we have had on the air
> here in the Chicagoland area was on 1.2 ghz. It was 76 miles. It was dead
> solid.
>
> One antenna was at 1200 feet agl, the other was at around 500 agl. Where
> Ground level (gl) was actually the middle of Lake Michigan.
>
> Clearly, with a mountain/valley altitude variation , typically allot
> more than 1200 feet, ur going to be able to go allot farther.
>
> So don t count out microwaves, simply because of range. Due to the physics
> of the problem microwaves may just be what ur looking for!
>
> Below 1 Ghz, its tuff to get a first fresnel clearance. A grazing path
> incurs about 20 dB extra path loss than a free space path. A First Fresnel
> clearance path has 6 dB gain (that s right, 6 dB LESS loss) than free space.
> The high the frequency, the less the required clearance of the center of the
> path, to have a first fresnel path. Indeed, on 220, the first fresnel clearance
> between 2 450 foot high antennas, over smooth earth, is only about 14 miles.
> That is, the distance for first fresnel clearance. On 10 Ghz, a 30 mile path
> only needs a small fraction of that clearance (on the order of 30 feet).
>
> Its this magic , which lets u run flea power on microwaves, and cover
> tremendous distances. Combine this with antenna gain, and u can run megabaud
> at tremendous distances!
>
> 73, Don.
>
> Mailbox : WB9MJN @ N9HSI.IL.USA.NA
> AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
> Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

80. Re: [SS:1127] Preliminary Design

From: Stefano Coccon <coccpce@mailbox.nauta.it>
Date: Sun, 09 Mar 1997 09:49:23 -0800
To: ss@tapr.org
Message-ID: <3322F823.6EC3@mailbox.nauta.it>
Rendered body type: text/plain

cape.net@surfergirl.spacey.net wrote:

>
> I have come up with a preliminary design of the SS box. I have tried to make
> it as generic as possible, without including un-necessary details. My idea
> is to get an idea of the overall design and how the pieces of the puzzle
> will fit together. I don't won't to lose sight of the forest for the trees,
> if you know what I mean.

Dear Tony, this is the first practical synthesis I have seen; I agree with you.

>
> \/
> |
> |
> | +-----+ +-----+ +-----+
> | | RF | | SS | | DATA | |<--- Voice
> +-----+ |<---+ |<---+ |<--- Ethernet
> | Section | | Section | | Interface | |<--- RS-232/RS-422
> | | | | | | |
> +-----+ +-----+ +-----+
>
> Obviously, there is more to the system than this, but it is a start. I feel
> that with a system such as this, all persons interested in the design can be
> happy. The only 'grey' area is the interfacing between the SS and DATA
> Interface sections. How is the data transfer going to handled? I feel that
> the SS section should have a constant data rate. Only the data rates to and
> from the DATA Interface section should be varied.
>
> The RF section could have all circuitry for translating the data into the
> RF spectrum and would also contain the interfacing to the antennae. It would
> also have the IF circuitry, automatic power control interfacing (to the SS
> section), AGC, and other stuff I can't think of right now. The SS section
> would do spreading/de-spreading, modulation/demodulation, FEC, PN
> generation, DS-FH-hybrid control (to RF section?). The DATA Interface would
> contain rate buffers (FIFOs) for data transfer (for slow mode interfaces
> such as rs-232), ADCs for voice, interfacing for a front panel (if desired).
>

This is an interesting point.
Basically we are dealing with a synchronous (or virtually synchronous)
data channel
whose rate, including the synchronization data overhead, is some
percentage lower
than the maximum system's transfer rate.

The need of a FIFO, of course is also required to compensate some poor
transmission
conditions; its size is an interesting parameter.

>
> There is a great deal of planning that would need to go into a project of
> this magnitude. The above is a starting point. The only thing left to do is
> decide on how the major blocks are going to connect to each other.
>
> Tony KE4AT0

The steps that should be followed in the development of the 'THING' are,
according
to your blocks, from right to left.

I have divided the whole system into three loops:

- the final system itself
- synchronous data loop (short loop 'A')
- scrambled data loop (short loop 'B')

\/
| +-----+ +-----+ +-----+
| | | | | | |<--- Voice

> Fujitsu MB8XXX 10Base-T controller is around \$13.50. Obviously, if we go
> to a distributor and make a low 1000's purchase commitment that price
> could drop considerably. Add another \$8 bucks for the requisite
> transformer and other 10Base-T interface junk and you are done.

And you are right up there with a no-brainer \$20 NE2000 card. The NE2000 is bigger but a lot less hassle. May I suggest integrating ethernet on the second generation system? And lets not worry about 10baseT yet?

> Further, ISA is MUCH easier to implement in an embedded design. For the
> 68K family it typically takes a pair of 16V8 GALs and a couple of
> bi-directional bus buffers. If you use one of the embedded 80XX86 family
> parts you get the ISA bus for free. PCI has some VERY stringent timing
> requirements which make it very costly to implement in on a small scale.
> And besides, at the actual speeds we are discussing adding a PCI bus
> would be like killing a bug with a bazooka.

I tend to agree. I'd love to have the problem of *needing* to redesign because we've exceeded ISA's bandwidth with our RF solution.

--

David Kelly N4HHE, dkelly@hiwaay.net

=====

The human mind ordinarily operates at only ten percent of its capacity -- the rest is overhead for the operating system.

82. Re: [SS:1090] RE: 1085] RE: 1080] Re: SS Design Interfaces

From: Phil Karn <karn@qualcomm.com>
Date: Tue, 11 Mar 1997 16:09:56 -0800 (PST)
To: ss@tapr.org
Message-ID: <199703120009.QAA13825@servo.qualcomm.com>
Rendered body type: text/plain

>If you are looking for faster data rates, (digital including speech,
>text, video etc.), ethernet is a way to go. However, this implies there
>is some other interface, RS232 etc. i.e. a console port, which is needed
>to administer the ethernet interface.

No it doesn't. There are many ways to initialize a device with an Ethernet port but no serial port. It's especially easy if the device comes programmed with a unique Ethernet hardware address, as it should. But even if it doesn't, there are ways around this.

A while back I bought a 3rd party Ethernet interface for my HP laser printer. I configured the whole thing through the Ethernet; no serial port was involved. It was nice not to have to hook up a temporary RS-232 cable just to initialize the device.

I use RS-232 so seldom these days that dealing with it has become a real pain. I never seem to have the right cable, or one that's long enough, or one with the right gender connectors, or with the right type of connector (DB-25 vs DB-9), or one with (or without) a null modem built in, etc.

RS-232 must die.

Phil

83. Re: [SS:1091] Re: WT Docket No. 97-12 - Hollow Victory?

From: Phil Karn <karn@qualcomm.com>
Date: Tue, 11 Mar 1997 16:12:35 -0800 (PST)
To: ss@tapr.org
Message-ID: <199703120012.QAA13833@servo.qualcomm.com>
Rendered body type: text/plain

>The ARRL proposal (RM-8737) states that automatic power control
>be implemented for systems which run more than 1W of power. Since
>all Part 15 devices (to the best of my knowledge) run 1W or less
>this rule should not hinder Hams at all.

Right. The 1W threshold was put there specifically to grandfather existing Part 15.247 devices, which are all limited to 1W.

This is actually quite a bit of power, especially when efficient modulation and coding is used in combination with reasonably good antennas.

Phil

84. Re: [SS:1103] Re: SS digest 258

From: Phil Karn <karn@qualcomm.com>
Date: Tue, 11 Mar 1997 17:14:56 -0800 (PST)
To: ss@tapr.org
Message-ID: <199703120114.RAA13940@servo.qualcomm.com>
Rendered body type: text/plain

John Paul Morrison writes...

>Linux? Can we quote you as an endorser of Linux, coming from a BSD
>guy? :-)

Sure. I've been running it on my laptop for some months now. I originally tried FreeBSD, but I could never get it to work with my PCMCIA cards (the kernel panicked at attach time). Linux still has its nits, especially on laptops, but at least it can be massaged to work reasonably well.

I still run BSDI on my home system, because stability and availability is paramount there. But it is really falling behind Linux in support of new features. Linux is really getting quite impressive.

>But anyway, I saw Alan Cox the Linux network code designer talking
>about your sound blaster code with FEC coding. Does this code
>exist for NOS or Linux? (I know the soundblaster code and viterbi
>code exist separately, but are they rolled into one device now?)

I can't speak for what anyone might have done with my code, but so far I have only built the core modules for a Viterbi decoder and related items. Much work remains to be done to build a complete, working modem, not to mention the new link layer protocol that will be needed.

>I've come round to your thinking of using a generic PC to do all
>the DSP and coding. It's far easier to leverage the PC software (ie
>Linux or the GCC version of NOS/TNOS) to control a new device. IF
>a 386 with a soundblaster can replace a traditional multiport
>1200/9600bps TNC, then a 486 or Pentium could do spread spectrum
>or something else. There's also free software that does Iphone like
>features, multicast audio etc. So a PC could do voice or video as
>well not just "data" networking.

Exactly. And if this year's PCs are too slow or too expensive to do what you want, just wait a while.

>Ascend and Cisco can take Motorola 68EN360's, ethernet, serial, flash
>and dram and sell little remote access routers for \$1000 or less
>because they have the sales volume to make the hardware prices cheaper
>and to amortize the programming development over many other products
>that use the same software. Hams can't build anything that fancy
>AND that cheap.

Bingo!

85. Re: [SS:1113] Re: WT Docket No. 97-12 - Hollow Victory?

From: Phil Karn <karn@qualcomm.com>
Date: Tue, 11 Mar 1997 18:27:06 -0800 (PST)
To: ss@tapr.org
Message-ID: <199703120227.SAA14055@servo.qualcomm.com>
Rendered body type: text/plain

>You miss my point completely however. Why do you support a specific rule
>for automatic power control for SS systems and not for narrowband systems?

Narrowband and spread systems are fundamentally different. A narrowband FDM scheme is perfectly orthogonal; that is, you can (in theory) make a filter that accepts one signal while perfectly rejecting all others.

Not so for spread spectrum. Spread signals are not perfectly orthogonal. A receiver (spread or narrowband) can reject an undesired signal by only the amount of the processing gain, which is the ratio of the spread bandwidth to the unspread bandwidth. This creates the famous "near-far problem", and it can *only* be solved by transmitter power control.

Look at it another way. There are two dimensions to spectrum consumption: bandwidth and power. In exchange for relaxing constraints on the former, it is reasonable to accept constraints on the latter -- especially since it leaves us well ahead on the deal. Digital modulation, especially with strong coding, has a strong threshold

effect. There is simply nothing to be gained by running more power than necessary (unlike linear analog schemes where cranking up your signal always makes it sound just a little bit better.)

Running excessive power in a digital system is like turning up the stove when the water in the pot is already boiling -- it doesn't make the spaghetti cook any faster. It just wastes gas and heats up the kitchen.

We are going to have enough trouble dealing with the rabid opposition to spread spectrum among the repeater, weak signal and satellite crowd even *with* the proposed requirement for automatic transmitter power control.

Phil

86. Re: [SS:1136] Re: WT Docket No. 97-12 - Hollow Victory?

From: Jeff King <jeff@mich.com>
Date: Tue, 11 Mar 1997 21:27:19 -0500
To: ss@tapr.org, ss@tapr.org
Message-ID: <2.2.32.19970312022719.0083fe54@mail.mich.com>
Rendered body type: text/plain

At 06:22 PM 3/11/97 -0600, Phil Karn wrote:
>>The ARRL proposal (RM-8737) states that automatic power control
>>be implemented for systems which run more than 1W of power. Since
>>all Part 15 devices (to the best of my knowledge) run 1W or less
>>this rule should not hinder Hams at all.
>
>Right. The 1W threshold was put there specifically to grandfather
>existing Part 15.247 devices, which are all limited to 1W.

Hi Phil:

Not many (none?) Part 15 devices currently implement power control. Hence the only advantage of using a Part 15 device under Part 97 rules is going to be the ability to run higher antenna gains. At that point I say, why bother? Just run them Part 15 and worry a lot less. I don't think Jerry would disagree either on that statement.

>
>This is actually quite a bit of power, especially when efficient
>modulation and coding is used in combination with reasonably good
>antennas.
>
>Phil
>

I'm glad you (I think) agree that 1 watt is quite a bit of power and that it also needs to fall under the provision of power control as well. I've run 173KBPS SS links over 12 miles using only 10mw.

In the bay area MetriCom is saturating the various cities with "pole top" 900mhz frequency hoppers. To the best of my knowledge, no power control is being implemented. While these are Part 15 devices, and as such limited to "only" 1 watt, the potential here is tremendous for interference to other users of the band. This is true by the sheer number of these 1 watt stations. Even if MetriCom is implementing power control, the majority (all?) Part 15 manufacturers are not. I'd hazard to guess the ratio on 900mhz of Part 15 vs. Ham emitters is >3000:1.

Power control for ad hoc networks is needed, REGARDLESS of the transmitter power, be it 1 watt, 10 milliwatts or 100 watts. To set a arbitrary cutoff of 1 watt clearly is NOT a technical decision but a political one. Most amateurs are going to be hard pressed to generate more than 10 watts on 2.4ghz giving only a 10 db margin of protection for "automatic" power control as contrasted with a 1 watt "manual" emitter. Put that 1 watt into a 30db gain parabolic dish and you'll have 1000 watts ERP.

Automatic power control should either apply to all users and modes with no arbitrary cutoff level or we shouldn't have it at all. There have been no documented cases of amateur spread spectrum operators running excessive power while there are numerous cases of narrow band operators running excessive power. To only mandate automatic power control for amateur spread spectrum while closing your eyes to the violations of the narrow band operators is hypocritical. I don't

buy the arguments of others that narrow band automatic power control is not technically, or "politically" possible. Older equipment could be grand fathered. I don't expect change to happen overnight, but change will happen. Its up to us now to make sure that SS isn't given the shaft, with regards to any rule makings.

Phil, I'm sure your more aware of what back room "dealings" went on with RM-8737 then I am, so I'll need to defer to you on this. I just think automatic power control for ad hoc networks is a good thing, at all power levels. I don't think amateur spread spectrum should be the only mode in which automatic power control is mandated by law. To me, this is a all or nothing question. Possibly you know why this compromise was made, but I think its a mistake to single out spread spectrum only.

Regards,

-Jeff wb8wka

87. RE: 1137] Re: SS digest 258

From: Ralph Ward <rw@txcc.net>
Date: Tue, 11 Mar 1997 21:08:33 -0600
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BC2E60.C1420A00@port9.txcc.net>
Rendered body type: text/plain

Stupid question time!

Is there a PSK modem for the soundblaster that will run on an old 486? Have one of those, but can't afford to buy a DSP-93 or etc.

Thanks.

Ralph Ward KB5UAA

-----Original Message-----

From: Phil Karn [SMTP:karn@qualcomm.com]
Sent: Tuesday, March 11, 1997 7:19 PM
To: ss@tapr.org
Subject: [SS:1137] Re: SS digest 258

John Paul Morrison writes...

>Linux? Can we quote you as an endorser of Linux, coming from a BSD
>guy? :-)

Sure. I've been running it on my laptop for some months now. I originally tried FreeBSD, but I could never get it to work with my PCMCIA cards (the kernel panicked at attach time). Linux still has its nits, especially on laptops, but at least it can be massaged to work reasonably well.

I still run BSDI on my home system, because stability and availability is paramount there. But it is really falling behind Linux in support of new features. Linux is really getting quite impressive.

>But anyway, I saw Alan Cox the Linux network code designer talking
>about your sound blaster code with FEC coding. Does this code
>exist for NOS or Linux? (I know the soundblaster code and viterbi
>code exist separately, but are they rolled into one device now?)

I can't speak for what anyone might have done with my code, but so far I have only built the core modules for a Viterbi decoder and related items. Much work remains to be done to build a complete, working modem, not to mention the new link layer protocol that will be needed.

>I've come round to your thinking of using a generic PC to do all
>the DSP and coding. It's far easier to leverage the PC software (ie
>Linux or the GCC version of NOS/TNOS) to control a new device. IF
>a 386 with a soundblaster can replace a traditional multiport
>1200/9600bps TNC, then a 486 or Pentium could do spread spectrum
>or something else. There's also free software that does Iphone like
>features, multicast audio etc. So a PC could do voice or video as
>well not just "data" networking.

Exactly. And if this year's PCs are too slow or too expensive to do what you want, just wait a while.

>Ascend and Cisco can take Motorola 68EN360's, ethernet, serial, flash
>and dram and sell little remote access routers for \$1000 or less
>because they have the sales volume to make the hardware prices cheaper
>and to amortize the programming development over many other products

>that use the same software. Hams can't build anything that fancy
>AND that cheap.

Bingo!

88. Re: [SS:1139] Re: WT Docket No. 97-12 - Hollow Victory?

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Tue, 11 Mar 1997 19:28:29 -0800
To: ss@tapr.org
Message-ID: <v03101f0faf4bd30f71dd@[204.118.182.22]>
Rendered body type: text/plain

At 8:34 PM -0600 3/11/97, Jeff King wrote:

>In the bay area MetriCom is saturating the various cities with
>"pole top" 900mhz frequency hoppers. To the best of my knowledge,
>no power control is being implemented. While these are Part 15
>devices, and as such limited to "only" 1 watt, the potential here
>is tremendous for interference to other users of the band. This
>is true by the sheer number of these 1 watt stations. Even if
>MetriCom is implementing power control, the majority (all?)
>Part 15 manufacturers are not. I'd hazard to guess the ratio on
>900mhz of Part 15 vs. Ham emitters is >3000:1.

MetriCom implements and uses auto power control in both their pole
top and end-user devices.

-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com  
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM  
Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>  
Fax: (510) 770-9854 !  
~~~~~

89. Re: [SS:1138] Re: WT Docket No. 97-12 - Hollow Victory?

From: Jeff King <jeff@mich.com>
Date: Tue, 11 Mar 1997 23:36:31 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970312043631.00869ddc@mail.mich.com>
Rendered body type: text/plain

At 08:31 PM 3/11/97 -0600, Phil Karn wrote:

>>You miss my point completely however. Why do you support a specific rule
>>for automatic power control for SS systems and not for narrowband systems?
>
>Narrowband and spread systems are fundamentally different. A narrowband
>FDM scheme is perfectly orthogonal; that is, you can (in theory) make
>a filter that accepts one signal while perfectly rejecting all others.

I understand they are different. I also understand even commercial
interests do power control on narrowband signals for frequency
re-use. Your analog narrowband analog cell phone does power control.
Power control is a good thing even for narrowband emissions.

>

>Not so for spread spectrum. Spread signals are not perfectly
>orthogonal. A receiver (spread or narrowband) can reject an undesired
>signal by only the amount of the processing gain, which is the ratio
>of the spread bandwidth to the unspread bandwidth. This creates the
>famous "near-far problem", and it can *only* be solved by transmitter
>power control.

I think you made my point for power control of narrow band transmitters.

>

>Look at it another way. There are two dimensions to spectrum
>consumption: bandwidth and power. In exchange for relaxing constraints
>on the former, it is reasonable to accept constraints on the latter --
>especially since it leaves us well ahead on the deal. Digital
>modulation, especially with strong coding, has a strong threshold
>effect. There is simply nothing to be gained by running more power
>than necessary (unlike linear analog schemes where cranking up your
>signal always makes it sound just a little bit better.)

>

>Running excessive power in a digital system is like turning up the

>stove when the water in the pot is already boiling -- it doesn't make
>the spaghetti cook any faster. It just wastes gas and heats up the
>kitchen.

Why doesn't this same analogy apply to narrowband users as well?

I think you misunderstood my point Phil. I'm NOT saying power control is bad for digital systems, as you seem to think. I'm questioning the hypocrisy of mandating it by law for only one amateur mode. Heck Phil, look at the comments you filed on the NPRM. You said:

"In particular, the amateur service has all but ignored the RF power dimension, giving little more than lip service to the requirement to run only the minimum power required to maintain communications"

My assumption here is you are referring to narrowband emissions. Is this correct? If so, you are making a clear point to not only have power control in wide band but also in narrowband modes.

>
>We are going to have enough trouble dealing with the rabid opposition
>to spread spectrum among the repeater, weak signal and satellite crowd
>even *with* the proposed requirement for automatic transmitter power
>control.
>
>Phil

Well, and I think this is the whole point. We need to cowtow to the ignorant masses, right? Automatic power control simply makes sense, to mandate it by law for amateur SS while not requiring it for Part 15 SS emissions and amateur narrowband emissions, at best, is hypocrisy. But if this is the only way to get it through, then I guess so be it.

-Jeff

90. Re: [SS:1124] RE: 1097] Re: WT Docket No. 97-12 - Holl

From: Phil Karn <karn@qualcomm.com>
Date: Tue, 11 Mar 1997 21:24:16 -0800 (PST)
To: ss@tapr.org
Message-ID: <199703120524.VAA14380@servo.qualcomm.com>
Rendered body type: text/plain

>OK. That's fair enough. What about the already existing Part 15 equipment
>that exists and that some of us are currently using under the TAPR-STA?
>Will we be grandfathered?

Yes. The 1W limit for non-power-controlled equipment matches the 1W limit under Part 15.247.

>So far we don't disagree. A vastly overpowered narrowband system can
>cause quite a bit of interference to a DSSS system, especially with
>many of the low process gain chipsets that are on the market.

Not to mention what it will do to narrowband systems trying to share the same spectrum. We are already having enough trouble trying to convince the weak-signal, repeater and satellite guys that SS can coexist even with mandatory power control.

>BTW, speaking of overpowered, the rules set the limit at 100watts which
>is only 20db over the non-automatic power control limit of 1 watt. And
>I'd hazard to guess not very many will run much over 10watts on 900mhz
>and above as it becomes quite costly. So we really are only talking
>10db of protection. Seems to me power control should apply all the
>way down to microwatts if its really going to be effective.

You have a point here. The 1W limit, as I said, was to grandfather Part 15.247 devices. But it's my opinion that it was a mistake to not require automatic transmitter power control in the Part 15 rules. The result is a rather badly polluted 902 MHz band. I'm hoping that ham radio can avoid repeating the mistakes of the Part 15 world.

>Jon, I'm sure I'm coming off like a Bull in a China Shop, but I think the NPRM
>is hypocritical to require power control for SS users while
>not at least suggesting power control for other users of the band (be
>they narrowband amateur or Part 15 SS). I by and large support the NPRM with

As I said in another message, there is a fundamental difference between

narrowband and SS operation that makes power control mandatory for SS even if it's merely desirable for narrowband.

Phil

91. Re: [SS:1143] RE: 1097] Re: WT Docket No. 97-12 - Holl

From: Jeff King <jeff@mich.com>
Date: Wed, 12 Mar 1997 02:42:22 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970312074222.006e1d00@mail.mich.com>
Rendered body type: text/plain

At 11:29 PM 3/11/97 -0600, Phil Karn wrote:

>>BTW, speaking of overpowered, the rules set the limit at 100watts which
>>is only 20db over the non-automatic power control limit of 1 watt. And
>>I'd hazard to guess not very many will run much over 10watts on 900mhz
>>and above as it becomes quite costly. So we really are only talking
>>10db of protection. Seems to me power control should apply all the
>>way down to microwatts if its really going to be effective.
>

>You have a point here. The 1W limit, as I said, was to grandfather
>Part 15.247 devices. But it's my opinion that it was a mistake to not
>require automatic transmitter power control in the Part 15 rules. The
>result is a rather badly polluted 902 MHz band. I'm hoping that ham
>radio can avoid repeating the mistakes of the Part 15 world.

Phil:

Please note power control is not required for ham systems running under 1 watt as the NPRM reads now. While I understand that the 1W was to grandfather Part 15.247, there really is no point to this. Other then token amateur operations, no one in there right mind would want to operate them under Part 97. Just to much liability... or at least that's my opinion. Also, don't forget a narrowband ID is required under the NPRM. This kinda rules out most off the shelf Part 15 equipment anyways.

If we indeed want to do it right, AND we feel that we need the government to mandate it, we should require auto power control for all amateur SS emissions above, lets say 100 micro watts (0.0001 watt). The point here is 1 watt is to high of a cap. Power control on digital SS systems, as Lyle pointed out, is a trivial matter. As you pointed out, we should avoid the mistakes of the Part 15 world.

I'm not convinced we need, or it is even wise to have government mandated automatic power rules and equations for amateur SS. None-the-less I understand the desirability of automatic power control for radio systems.

-Jeff wb8wka

92. Re: [SS:1141] Re: WT Docket No. 97-12 - Hollow Victory?

From: Jeff King <jeff@mich.com>
Date: Wed, 12 Mar 1997 02:46:18 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970312074618.006efac8@mail.mich.com>
Rendered body type: text/plain

At 09:33 PM 3/11/97 -0600, Dewayne Hendricks wrote:

>At 8:34 PM -0600 3/11/97, Jeff King wrote:

>>In the bay area MetriCom is saturating the various cities with
>>"pole top" 900mhz frequency hoppers. To the best of my knowledge,
>>no power control is being implemented.

> Metricom implements and uses auto power control in both their pole
>top and end-user devices.

>

>-- Dewayne

>

Thanks Dewayne, I wasn't sure about this. Its interesting to note that they are not required to do this under Part 15, but chose to.

-Jeff

93. Eb/(No+Io)

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Wed, 12 Mar 1997 06:33:45 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970312113345.0033bd18@mindspring.com>
Rendered body type: text/plain

Well, there has been a lot of discussion pro and con for power control in other modes and at what threshold it should be required. However, I still don't know the answer to the question I posed in [SS:1106]:

Is the conversion from BER (or anything else available from available chip sets) to Eb/(No+Io) simple and is it implemented in any of the transceiver interfaces available?

We simply can't comply with the proposed rule allowing us to exceed 1 watt if we can't implement the Eb/(No+Io) measurement. The chips I know about give a analog "Received Signal Strength Indicator" or a BER. How do you equate those measurements to Eb/(No+Io)?

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
<http://www.mindspring.com/~lfry/part15.htm>

94. Re: [SS:1145] Re: WT Docket No. 97-12 - Hollow Victory?

From: Steve Sampson <ssampson@claven.tinker.af.mil>
Date: Wed, 12 Mar 1997 08:22:55 -0600
To: ss@tapr.org
Message-ID: <3326BC3E.41C6@eds.tinker.af.mil>
Rendered body type: text/plain

Jeff King wrote:

>
> At 09:33 PM 3/11/97 -0600, Dewayne Hendricks wrote:
> > Metricom implements and uses auto power control in both their pole
> > top and end-user devices.
> >
> > Thanks Dewayne, I wasn't sure about this. Its interesting to note that
> > they are not required to do this under Part 15, but chose to.

It's not a technical or do-gooder thing, it's an investment. Marketing says they want to sell xxxx accounts, engineering responds with a way to do this, + a little slop. If they used no power control: marketing would fail, the stock would fail, and investors would go away.

Big business doesn't plan anything for the short term.

They also would not tolerate a bunch of choo-choo era morse code ID's every 10 minutes in the middle of their fricking channel :-)

Steve
"reading my marketing 101 notes"

95. George Gilder on CDMA

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Wed, 12 Mar 1997 07:04:06 -0800
To: dewayne-net@warpspeed.com (Dewayne's Wireless News List), ss@tapr.org, ss-sta@tapr.org
Message-ID: <v0310200aaf4c75619c22@204.118.182.22>
Rendered body type: text/plain

In the latest edition of 'Forbes ASAP', George Gilder has an article with his views on CDMA technology, entitled "Telecosm and Beyond: Over The Paradigm Cliff". Check it out at:

<<http://www.forbes.com/asap/97/0224/029.htm/>>

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com  
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM  
Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>  
Fax: (510) 770-9854 !  
~~~~~

96. Re: [SS:1146] Eb/(No+Io)

From: wb9mjn@wb9mjn.ampr.org
Date: Wed, 12 Mar 97 08:47:25 UTC
To: ss@tapr.org
Message-ID: <13127@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Lee,

The direct way to determine Eb/(No+Io) is to measure the errors in a test transmission of known period, of a PRN sequence.

K9NG published a paper on using PRN sequences to measure Bit Error rates a year or two after his modem paper.

The technique can be directly carried over to spread spectrum , at the tail end of all processing.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

97. Re: [SS:1146] Eb/(No+Io)

From: wb9mjn@wb9mjn.ampr.org
Date: Wed, 12 Mar 97 08:50:13 UTC
To: ss@tapr.org
Message-ID: <13129@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi again Lee,

In spread spectrum there is an additional way to determine Eb/(No+Io).

One can compare the the narrow band despread power, and the narrow band spread signal powers, before and after the despreading device. This is neccassarily a technigue requiring wideband IF amplification, or momentary disabling of the despreading function.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

98. Re: [SS:1146] Eb/(No+Io)

From: Jeff King <jeff@mich.com>
Date: Wed, 12 Mar 1997 11:14:59 -0500
To: ss@tapr.org, ss@tapr.org
Message-ID: <2.2.32.19970312161459.00882a1c@mail.mich.com>
Rendered body type: text/plain

At 05:32 AM 3/12/97 -0600, Lee W. Fry wrote:

>Is the conversion from BER (or anything else available from available chip
>sets) to Eb/(No+Io) simple and is it implemented in any of the transceiver
>interfaces available?

>

>We simply can't comply with the proposed rule allowing us to exceed 1 watt
>if we can't implement the Eb/(No+Io) measurement. The chips I know about
>give a analog "Received Signal Strength Indicator" or a BER. How do you
>equate those measurements to Eb/(No+Io)?

>

>Lee W. Fry AA0JP

Then Don said:

>Hi Lee,

>

> The direct way to determine Eb/(No+Io) is to measure the errors in a

>test transmission of known period, of a PRN sequence.
>
> K9NG published a paper on using PRN sequences to measure Bit Error rates
>a year or two after his modem paper.
>
>
> The technique can be directly carried over to spread spectrum , at the
>tail end of all processing.

Hi Lee:

Don didn't answer your question.

I've already said too much on SS-SIG to point this out, but you may want to bring it up if you don't get the right answer. While many of the existing off the shelf chip sets give you a BER, I'm not sure if any give $E_b/(N_o+I_o)$. This being the case, the rules might stifle any adaptation of these existing chip sets into amateur SS gear. However, I'd hazard to guess you could equate the chip sets BER or merit figure over to $E_b/(N_o+I_o)$ using a lookup table. You would need to manually chart it out so it wouldn't be for the faint at heart. The good news (I think) is if the chip manufacturers see a market, I'd bet they would be willing to do this.

Regards,

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-----
| Jeff King      Aero Data Systems |
| jeff@mich.com  P.O. Box 510895   |
| (810)471-1787  Livonia, MI 48151 |
| F(810)471-0279 United States     |
-----
```

99. Re: [SS:1143] RE: 1097] Re: WT Docket No. 97-12 - Holl

From: Bob Nielsen <nielsen@primenet.com>
Date: Wed, 12 Mar 1997 10:37:35 -0700 (MST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970312092202.1943B-100000@nielsen.tus.primenet.com>
Rendered body type: text/plain

On Tue, 11 Mar 1997, Phil Karn wrote:

> As I said in another message, there is a fundamental difference between
> narrowband and SS operation that makes power control mandatory for SS
> even if it's merely desirable for narrowband.

It's more than just desirable (but rarely observed):

97.313 Transmitter power standards

(a) An amateur station must use the minimum transmitter power necessary to carry out the desired communications.

Bob

```
-----
Bob Nielsen      Internet: nielsen@primenet.com
Tucson, AZ       AMPRnet:  w6swe@w6swe.ampr.org
                  AX.25:    w6swe@wb7tls.az.usa.noam
                  http://www.primenet.com/~nielsen
```

100. Re: [SS:1139] Re: WT Docket No. 97-12 - Hollow Victory?

From: Phil Karn <karn@qualcomm.com>
Date: Wed, 12 Mar 1997 20:16:09 -0800 (PST)
To: ss@tapr.org
Message-ID: <199703130416.UAA18380@servo.qualcomm.com>
Rendered body type: text/plain

>Not many (none?) Part 15 devices currently implement power control.
>Hence the only advantage of using a Part 15 device under Part
>97 rules is going to be the ability to run higher antenna gains.
>At that point I say, why bother? Just run them Part 15 and worry
>a lot less. I don't think Jerry would disagree either on that
>statement.

Agreed here too.

>Power control for ad hoc networks is needed, REGARDLESS of the
>transmitter power, be it 1 watt, 10 milliwatts or 100 watts. To

>set a arbitrary cutoff of 1 watt clearly is NOT a technical
>decision but a political one. Most amateurs are going to be

Bingo. IS-95 CDMA power control has a dynamic range on the order of 80dB.
In fact, max power output of a typical portable is only 300mW, into
a rotten antenna.

If it were necessary for the rule changes to pass, I'd be willing to
go along with *lowering* the 1W grandfather limit for no power control
-- at least for the bands where existing Part 15 equipment isn't of use
(e.g., 6m-70cm).

I also agree that it would be nice to require automatic power control
in narrowband systems, but this is politically untenable right now.
Also, power control is just not *quite* as essential in a narrowband
system as it is in a SS system.

Perhaps if we can show how well power control works with spread
spectrum, things may change.

By the way, I think I can take credit for the power control rule, plus
the $E_b/(N_0+I_0)$ limit formulation. I originally suggested it to the
Future Systems Committee, who suggested it to the ARRL Board, who in
turn suggested it to the FCC. So I guess I deserve whatever kudos and
brickbats are forthcoming here.

Phil

101. Re: [SS:1144] RE: 1097] Re: WT Docket No. 97-12 - Holl

From: Phil Karn <karn@qualcomm.com>
Date: Wed, 12 Mar 1997 20:32:44 -0800 (PST)
To: ss@tapr.org
Message-ID: <199703130432.UAA18414@servo.qualcomm.com>
Rendered body type: text/plain

>If we indeed want to do it right, _AND_ we feel that we need the
>government to mandate it, we should require auto power control for all
>amateur SS emissions above, lets say 100 micro watts (0.0001 watt).
>The point here is 1 watt is to high of a cap. Power control on
>digital SS systems, as Lyle pointed out, is a trivial matter. As
>you pointed out, we should avoid the mistakes of the Part 15 world.

I wouldn't call power control exactly "trivial" (the particular power
control scheme used in IS-95 was one of its most important
contributions to the SS art). But it's certainly doable, especially
since the rules don't specify any particular time constant.

I just don't want to make the dynamic range requirement *too* wide, as
that can be quite a challenge; attaining *really* low power levels can
take some pretty thorough design. If you're not careful, you end up
emitting far more energy from the radio than from the antenna!

Still, I expect that any SS designs we actually field will power
control well below the 1W level. After all, if you're going to do
power control at all, you might as well do it reasonably right.

Phil

102. Re: [SS:1146] Eb/(No+Io)

From: Phil Karn <karn@qualcomm.com>
Date: Wed, 12 Mar 1997 20:45:58 -0800 (PST)
To: ss@tapr.org
Message-ID: <199703130445.UAA18435@servo.qualcomm.com>
Rendered body type: text/plain

>We simply can't comply with the proposed rule allowing us to exceed 1 watt
>if we can't implement the $E_b/(N_0+I_0)$ measurement. The chips I know about
>give a analog "Received Signal Strength Indicator" or a BER. How do you
>equate those measurements to $E_b/(N_0+I_0)$?

There are several ways to measure $E_b/(N_0+I_0)$:

1. In the demodulator. The details depend on the precise modulation
method. It is generally possible to compute the mean-square
difference between the incoming signal and a locally regenerated copy
made from the best estimate of the incoming signals. This gives you an
estimate of the N_0+I_0 . You already know the total incoming
energy. From these figures and the data rate you can estimate
 $E_b/(N_0+I_0)$.

2. In the FEC decoder. Viterbi or Fano decoder metrics, or Fano decoder 'effort' (branches searched per data bit) measurements can be converted to $E_b/(N_0+I_0)$ estimates fairly easily based on the known properties of the code and decoder.

3. After FEC, e.g., in the ARQ algorithm. If you know your modulation + FEC requires, say, $E_b/N_0 = 6$ dB to produce error free data, then you simply crank down the power until you start getting errors, then come back up a little. You'll still be far under the limit.

Remember that you don't actually have to *measure* $E_b/(N_0+I_0)$, you simply need to design the system so that you stay under the limit in practice, on average.

It's just like the existing power limit. Staying under it is the important thing. *How* you do it is up to you. You may choose to measure it, or you may instead choose to design your system so that it inherently stays under the limit.

In the present case, $E_b/N_0 = 23$ dB is a *very* generous figure that can be met with almost any uncoded modulation scheme, reasonably implemented. I hope real implementations will do much better in practice; 6 dB is entirely achievable, even on a Rayleigh fading channel.

Phil

103. Re: [SS:1155] Re: $E_b/(N_0+I_0)$

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Wed, 12 Mar 1997 23:45:45 -0600
To: ss@tapr.org
Message-ID: <v03007861af4d3f608a52@[208.134.134.40]>
Rendered body type: text/plain

The question becomes Phil -- why put a higher level of measure to this mode then any other mode requires ?

Granted that we will design good systems and for those systems to work correctly power control will be a major design criteria, but as you and Tom Clark pointed out in your paper at the Central States VHF meeting there could be instances where power control is not practical....such as EME...or maybe SS gets used to communicate to the amateur Mars mission ? 1 watt probably isn't enough for either for those modes ?

Wouldn't you want to transmit the minimum amount of power needed up to the allowable limit within the hobby for the type of communications happening. Which Bob Nielson and some others have pointed is already covered in the rules.

When we ask for rules such as power control based on a formula as currently defined in the rule making are we not doing what we were trying to undo in the first place. That of removing constraints to allow more flexibility for experimentation and learning (removal of sequences and the like) -- but now we are adding new rules which might further limit what people can experiment with.

Although it is simple to see that the reason 1 watt and auto-power control is in there is as a bone to the Part 15 groups that see amateurs running more power as a threat to what they are doing. FCC hopes to make them happy -- but I think we can all agree that the Part 15 groups are going to be making a lot of negative comments to the docket. Meaning -- we all have to be sure to file our own comments in support of the change!

Power control is important, but does it need to be specifically mentioned in the SS section of the rules ? If SS is to be considered a mode like any other, we need to treat it the same as we handle other types within the rules and other modes are required to follow. There are plenty of rules in place already that concern power levels.

I think a more pressing issue will concern getting in-band ID accepted via the data stream transmitted. Just like packet and any of the other digital modes (a majority of the HF digital modes). Having to add a CW ID to the signal is what the world is trying to get away from -- right ? Comment should really be made to allow an ID to be transmitted in the data stream and as long as that spec is available (just like all the newer HF digital modes) it should be legal to do so. There is no difference between transmitting SS or some modulation on HF, VHF, or UHF when it comes to identification. Place the callsign every ten minutes in a packet and keep

on going. Could even add LAT/LON to the ID to help with locating the signal.

Also, of a more pressing issue is the frequency coverage. There will be demand to use SS systems below what the current rules allow. I think we can agree on that? If we don't ask for this mode to have full access to the bands like any other mode -- it might be years to allow SS on bands below the current ones authorized. While many might think this bad -- we might desperately need SS on 2, 219-220, and other freqs in the next 5 years to fend off those that say we don't utilize those bands and would want to take them over. Based on the fact that we occupy, but don't really utilize the billion of dollars of freqs we have access to.

Three key points in the rule making that should be of greatest concern are the freq issue, id'ing issue, and power limitations set in the rules.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

104. Re: [SS:1153] Re: WT Docket No. 97-12 - Hollow Victory?

From: Jeff King <jeff@mich.com>
Date: Thu, 13 Mar 1997 00:57:19 -0500
To: karn@qualcomm.com, ss@tapr.org
Message-ID: <2.2.32.19970313055719.008480a0@mail.mich.com>
Rendered body type: text/plain

At 10:20 PM 3/12/97 -0600, Phil Karn wrote:

>If it were necessary for the rule changes to pass, I'd be willing to
>go along with *lowering* the 1W grandfather limit for no power control
>-- at least for the bands where existing Part 15 equipment isn't of use
>(e.g., 6m-70cm).

At the risk of beating a dead horse (which I'm sure I've done time and time over by now), I do need to remind you that due to the requirements of a narrowband CW ID, no Part 15 equipment will be grandfathered that can't do a CW ID. While I'm sure the dedicated experimenter can rig something up, most won't bother and will just operate them under Part 15. I see no reason to compromise (grandfather) on the NPRM when the compromise will do us little good. If we are going to make a law to require automatic power control, it might as well be for something that is of some value. 20 db is not enough, especially considering the upper limit of 100watts.

>By the way, I think I can take credit for the power control rule, plus
>the Eb/(N0+I0) limit formulation. I originally suggested it to the
>Future Systems Committee, who suggested it to the ARRL Board, who in
>turn suggested it to the FCC. So I guess I deserve whatever kudos and
>brickbats are forthcoming here.
>
>Phil

I'd be interested in reading about power control theory in more detail.
Do you have any recommendations on texts?

Thanks

-Jeff

105. Re: [SS:1153] Re: WT Docket No. 97-12 - Hollow Victory?

From: Phil Karn <karn@qualcomm.com>
Date: Wed, 12 Mar 1997 22:04:03 -0800 (PST)
To: jeff@mich.com
Cc: ss@tapr.org
Message-ID: <199703130604.WAA18669@servo.qualcomm.com>
Rendered body type: text/plain

>I'd be interested in reading about power control theory in more detail.
>Do you have any recommendations on texts?

Well, there's Viterbi's textbook on CDMA. Addison-Wesley is the publisher.

106. Re: [SS:1153] Re: WT Docket No. 97-12 - Hollow Victory?

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Thu, 13 Mar 1997 10:21:59 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.91.970313101449.15917A-100000@tekdata.com>
Rendered body type: text/plain

> >Power control for ad hoc networks is needed, REGARDLESS of the
> >transmitter power, be it 1 watt, 10 milliwatts or 100 watts. To
> >set a arbitrary cutoff of 1 watt clearly is NOT a technical
> >decision but a political one. Most amateurs are going to be
>
> Bingo. IS-95 CDMA power control has a dynamic range on the order of 80dB.
> In fact, max power output of a typical portable is only 300mW, into
> a rotten antenna.
>
> If it were necessary for the rule changes to pass, I'd be willing to
> go along with *lowering* the 1W grandfather limit for no power control
> -- at least for the bands where existing Part 15 equipment isn't of use
> (e.g., 6m-70cm).
>
> I also agree that it would be nice to require automatic power control
> in narrowband systems, but this is politically untenable right now.
> Also, power control is just not *quite* as essential in a narrowband
> system as it is in a SS system.
>
> Perhaps if we can show how well power control works with spread
> spectrum, things may change.
>
How is the power control going to apply in systems that are not point
to point? Maybe I'm confused but if there is a "broadcast" mode or
"multipoint" mode available, then isn't one receiving station going to
need more power from the transmitter than the other? (except for the
special case where the signals are the same, of course..)

Isn't there the possibility that the power control might make monitoring
the SS communications by the FCC and other 3rd parties more difficult?

I guess then the "minimum" power would be for the farthest station?

Fred M. Spinner, KA9VAW
fred@tekdata.com

107. Re: [SS:1148] George Gilder on CDMA

From: Julian Fields <fields@svpal.org>
Date: Thu, 13 Mar 1997 10:10:37 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.3.88.9703130955.A12687-0100000@svpal.svpal.org>
Rendered body type: text/plain

Interesting article. He claims 3 to 6 times the
information carrying capacity for cell telephones.
Assuming the requirement for dead space between
channels in FDMA would account for 20% and another
20% due to dead space in TDMA, this would give
a 40% increase, not 3 to 6 times. Where does the
further improvement come from?

I guess you can have frequency reuse from neighboring
cells whereas analog cannot use the same frequency
in physically adjacent cells due to interference in
analog.
On the negative side, CDMA has already spread it's
interference to 10, 100, or millions of times the
minimum required spectrum.

So, where does 3 to 6 improvement come from?

On Wed, 12 Mar 1997, Dewayne Hendricks wrote:
> In the latest edition of 'Forbes ASAP', George Gilder has an
> article with his views on CDMA technology, entitled "Telecosm and Beyond:
> Over The Paradigm Cliff". Check it out at:
> <<http://www.forbes.com/asap/97/0224/029.htm>>

108. Re: [SS:1160] Re: George Gilder on CDMA

From: Kevin Jessup <kevin.jessup@mail.mei.com>
Date: Thu, 13 Mar 1997 13:54:04 -0600
To: ss@tapr.org
Message-ID: <01IGGFHUM74Y8ZIO9H@meipws.mis.mei.com>
Rendered body type: text/plain

Thanks for the pointer to Gilder's article.

In case others have not stopped in at Qualcomm's site for a while, there are a couple of articles responding to recent criticism of CDMA.

For what it's worth...

by Ira Brodsky
November 18, 1996 issue of Network World
<http://www.qualcomm.com/cdmatech/sink.html>

Perhaps this was already mentioned. I've been away from the SS sig for a while.

n9sqb
kevin.jessup@mail.mei.com
sr software engineer
marquette medical systems
<http://www.mei.com>

109. Re: [SS:1157] Re: WT Docket No. 97-12 - Hollow Victory?

From: "Robert P. McCabe" <rmccabe@sprintmail.com>
Date: Thu, 13 Mar 1997 14:09:13 -0600
To: ss@tapr.org
Message-ID: <33285EE9.3545@sprintmail.com>
Rendered body type: text/plain

Jeff King wrote:

>
> At 10:20 PM 3/12/97 -0600, Phil Karn wrote:
>
> >If it were necessary for the rule changes to pass, I'd be willing to
> >go along with *lowering* the 1W grandfather limit for no power control
> >-- at least for the bands where existing Part 15 equipment isn't of use
> >(e.g., 6m-70cm).
>
> At the risk of beating a dead horse (which I'm sure I've done time and
> time over by now), I do need to remind you that due to the requirements
> of a narrowband CW ID, no Part 15 equipment will be grandfathered that
> can't do a CW ID. While I'm sure the dedicated experimenter can rig
> something up, most won't bother and will just operate them under
> Part 15. I see no reason to compromise (grandfather) on the NPRM
> when the compromise will do us little good. If we are going to make a
> law to require automatic power control, it might as well be for something
> that is of some value. 20 db is not enough, especially considering the
> upper limit of 100watts.
>
> >By the way, I think I can take credit for the power control rule, plus
> >the Eb/(N0+I0) limit formulation. I originally suggested it to the
> >Future Systems Committee, who suggested it to the ARRL Board, who in
> >turn suggested it to the FCC. So I guess I deserve whatever kudos and
> >brickbats are forthcoming here.
> >
> >Phil
> >
> I'd be interested in reading about power control theory in more detail.
> Do you have any recommendations on texts?
>
> Thanks
>
> -JeffRe: Tx Power Control for SS

While SS Tx power control may be relatively simple on 2 party full duplex RF paths, that have an established power control protocol, with relatively stable path losses things can be more complex in other situations. For example:

a. Mobile Applications. How often does one adjust power levels to compensate for varying path losses? Is a full duplex path needed so that the sending end can be notified that received levels are too high or low?

b. What power does one use on an initial transmission?

c. If three or more parties were involved with a connection the power control protocol would have to look for the receiving station with the lowest received signal level. What if this round table included a number of mobiles?

d. Since the receiving station must transmit the measured $E_b/(N_0 + I_0)$, this automatic power control essentially prohibits one way broadcasts unless broadcasting station power is under 1 watt.

e. How can the FCC monitor or enforce this rule? Since this has to be automatic there has to be a standard way of doing this. Who establishes the standard? Will existing equipment be grandfathered? It raises an interesting legal question as to who is responsible. If it was just a limit on power output clearly it would be the transmitting operator. However, in this case, to meet the requirement at least two parties are involved.

f. The Notice of Proposed Rule Making (Docket 97-12) simply states that "Average transmitter power over 1 W shall be automatically adjusted to maintain an $E_b/(N_0 + I_0)$ ratio of no more than 23 dB at the intended receiver". There is no specification of the time period used to calculate the average, how often the receiving station has to make the measurements or if the receiving station has to notify the sending station immediately or on its next transmission.

A lot of unanswered questions. It looks to me that we should ask the FCC to hold off on the power control requirement until these issues are investigated and some consensus can be developed in the amateur community. Note that comments from interested parties on this NPRM must be filed with the FCC on or before May 5, 1997.

Bob McCabe W8JWK

110. Re: WaveLAN

From: Jeff King <jeff@mich.com>
Date: Thu, 13 Mar 1997 16:35:09 -0500
To: "Robert A. Buaas" <buaas@uv.wdc.net>
Cc: ss@tapr.org
Message-ID: <2.2.32.19970313213509.00733430@mail.mich.com>
Rendered body type: text/plain

Bob:

Also forwarding this on to ss-sig as it might be of some interest to those with WaveLans.

{Bob's response to my question about a problem I thought I had with one of the WaveLAN boards I had bought in the surplus buy 6-7 months ago.

At 12:20 PM 3/8/97 -0800, Robert A. Buaas wrote:

>Hi Jeff--
>
>does your antenna system short the center conductor to the shield?
>There's a current path there, used to switch the pin diodes in
>the diversity antenna. If you have a short, it's been known to
>blow up the card.... I have no info on what actually happens,
>but I did hear negative results.
>
..
>have a nice weekend. looked like bad weather up your way. condolences.
>
>best regards/bob
>

Bob:

Solved the problem and thought you might be interested in what I found. Your suggestion was what helped me find the problem. My antennas are DC open circuits.

The antennas were corner reflectors made by Olde Colorado Antennas out of Denver. 10dbi gain fed with about 75 feet of LMR-400. Distance I was trying to cover was only about 0.3 of a mile. Both cards are in Linux systems with WaveLAN support compiled into the kernel.

First day I installed the link they worked like a champ. Next day it didn't work. Some-one had tarred up the roof on one end of the link,

so I assumed they damaged the coax. Replaced it and still didn't work. Brought cards together and they worked fine with back of the set antennas. Did a flood ping with my bird wattmeter hooked up to each respective card, one card showed lower output. So, I ordered another card at (yuck) full list to replace the suspect card. Still didn't work.

After receiving your message, I talked with David at Olde Antenna and he told me his corner reflectors were DC open circuits. OK, that shot that theory down... On a lark, I hooked up the DC ohmmeter to the site where I had installed the new coax the previous day. I read a DC resistance of 300 ohms. On the end of the link where the coax was a bit older (it had been up about 7 days) I read a DC resistance of 50 ohms. Very strange. I climbed up the roof, took the antenna down, and measured it.... open circuit just as David had told me it would be. But the coax measured between 75-50 ohms DC resistance. Both coax s were tested when I made them in my shop and didn't exhibit any shorts or opens what-so-ever. The connectors were N type and were used but in good shape.

The telling thing about the whole incident was the newer coax (less time installed on the Wavelan) had a HIGHER short resistance (300) then the coax that had been on a longer period of time (50). The resistive shorts appeared to be in the rooftop connectors on both ends. Both rooftop connectors had been previous sealed with heat shrink boots and hot glue melt.

What I believe happened was that since the WaveLan puts a DC voltage on the COAX, this caused plating to occur across the coax/connector. Note that it was quite humid/moist when I installed both of these. When first installed, the links worked fine but failed after a while. The solder I used was standard rosin, not the water soluble type.

I've replaced both connectors and installed DC blocks at both of the wavelan boards. The link has worked fine now for three days.

Just thought I'd pass that along. Looks like its a good idea to install DC blocks on Wavelan boards, or so it appears to me.

-Jeff wb8wka

111. shannon limits

From: Dirk Koopman <djk@tobit.co.uk>
Date: Thu, 13 Mar 1997 22:06:27 +0000 (GMT)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970313220028.6223B-100000@dirku.tobit.co.uk>
Rendered body type: text/plain

This may not appear to be on subject, but in a funny way it may at least interesting if not directly relevant, anyway...

As some of you may have noticed US robotics have introduced a modem which appears to able to achieve information transfer speeds of 57600 bps in one direction and (AFAIK) back channel speeds of 14400 bps. Now add to the undoubted existence of modems capable of 33600 bps in both directions - where does this put the Shannon limit for a phone line (qv ANY channel) which is I believe a TOTAL max data rate of 30000 bps?

Confused of Dereham (Norfolk, UK)

--

Dirk-Jan Koopman Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than the piano when played by a sister or near relation." --Oscar Wilde

112. Re: [SS:1164] shannon limits

From: "Dale Heatherington" <wa4dsy@wa4dsy.radio.org>
Date: Thu, 13 Mar 97 19:37:06
To: "ss@tapr.org" <ss@tapr.org>
Message-ID: <m0w5Kzb-0002FsC@wa4mei.radio.org>
Rendered body type: text/plain

On Thu, 13 Mar 1997 16:10:57 -0600 (CST), Dirk Koopman wrote

>As some of you may have noticed US robotics have introduced a modem which
>appears to able to achieve information transfer speeds of 57600 bps in one
>direction and (AFAIK) back channel speeds of 14400 bps. Now add to the
>undoubted existence of modems capable of 33600 bps in both directions -
>where does this put the Shannon limit for a phone line (qv ANY channel)

>which is I believe a TOTAL max data rate of 30000 bps?

If found guilty of violating physical laws I hope they will be severely punished.

No, really. I think they depend on some small percentage of phone lines being better than average to support 56k. Most users will not get that kind of throughput.

Dale Heatherington, WA4DSY
e-mail - wa4dsy@wa4dsy.radio.org
e-mail - daheath@ibm.net (in case the first one doesn't work)
Web page - http://www.wa4dsy.radio.org
OS/2 Warp 4.0 The worlds finest desktop OS.

113. Re: [SS:1159] Re: WT Docket No. 97-12 - Hollow Victory?

From: Phil Karn <karn@qualcomm.com>
Date: Thu, 13 Mar 1997 18:32:28 -0800 (PST)
To: ss@tapr.org
Message-ID: <199703140232.SAA22137@servo.qualcomm.com>
Rendered body type: text/plain

>How is the power control going to apply in systems that are not point
>to point? Maybe I'm confused but if there is a "broadcast" mode or

This is the one valid concern I've heard so far. The logical answer is to say that the limit applies at the intended receiver where the signal is the weakest.

Having said that, I should point out that traditional broadcasting has always been rather wasteful of spectrum, and that broadcasting with spread spectrum is even more so. It would be much more efficient to multicast to that subset of stations who actually want to hear your broadcast, and to build a spanning tree on top of store-and-forward links between neighboring nodes. The Internet MBONE works much in this way.

So even in a SS "broadcasting" environment, power control would (or should) still be important.

Phil

114. Re: [SS:1160] Re: George Gilder on CDMA

From: Phil Karn <karn@qualcomm.com>
Date: Thu, 13 Mar 1997 19:44:37 -0800 (PST)
To: ss@tapr.org
Message-ID: <199703140344.TAA22327@servo.qualcomm.com>
Rendered body type: text/plain

>Assuming the requirement for dead space between
>channels in FDMA would account for 20% and another
>20% due to dead space in TDMA, this would give
>a 40% increase, not 3 to 6 times. Where does the
>further improvement come from?

The improvements come from a variety of sources. Eliminating guard bands and times is only part of it. Another is the variable rate vocoder that's easy to implement in CDMA, difficult or impossible in TDMA and FDMA. The typical voice user only speaks 40% of the time, so this yields an additional 2:1 improvement.

But the big gain comes from the 1:1 cellular frequency reuse pattern that CDMA makes possible. FM requires a C/I (carrier to interference) ratio of at least 17dB for decent performance, which in practice means a 7:1 reuse pattern (only 1/7 of the total channels are used in any one cell). In some difficult areas, even worse ratios have to be used.

But CDMA can operate with a *negative* C/I of about $6 - 22 = -16$ dB. +6 dB is the approximate E_b/N_0 requirement of the modulation and coding scheme in fading, and 22 dB is the process gain of the spreading. I.e., you can maintain a +6dB E_b/N_0 at the demodulator for a C/I ratio of -16 dB or better. This is what allows you to reuse the same 1.25 MHz frequency channel in every cell, and it's the single biggest factor in CDMA's capacity gain.

Phil

115. Re: [SS:1162] Re: WT Docket No. 97-12 - Hollow Victory?

From: Phil Karn <karn@qualcomm.com>
Date: Thu, 13 Mar 1997 20:14:01 -0800 (PST)
To: ss@tapr.org
Message-ID: <199703140414.UAA22369@servo.qualcomm.com>
Rendered body type: text/plain

>a. Mobile Applications. How often does one adjust power levels to
>compensate for varying path losses? Is a full duplex path needed so
>that the sending end can be notified that received levels are too high
>or low?

IS-95 CDMA uses two methods in combination: an open-loop scheme
(looking at the receiver AGC) and a closed loop scheme (the cell sends
delta-mod power up/down commands to the mobile at an 800 Hz rate).
This is sufficient for freeway speeds on the 1.9 GHz PCS bands.

I note that for packet data applications, the power control doesn't
have to be so fast if you send large packets and code and interleave
over the whole packet. Bursts of noise and interference (e.g., caused
by imperfect power control) that are "short" compared to the packet
will be corrected by the decoder.

>b. What power does one use on an initial transmission?

An estimate based on the open-loop (AGC) measurement.

>c. If three or more parties were involved with a connection the power
>control protocol would have to look for the receiving station with the
>lowest received signal level. What if this round table included a
>number of mobiles?

True. As I said in an earlier message this afternoon, transmitting
simultaneously to all receivers is not necessarily the most efficient
way to go, especially if those receivers are sparsely distributed.

>d. Since the receiving station must transmit the measured $E_b/(N_0 + I_0)$,
>this automatic power control essentially prohibits one way broadcasts
>unless broadcasting station power is under 1 watt.

No, it only says that the power must be controlled so that the
 $E_b/(N_0+I_0)$ limits are not exceeded. It doesn't say that there has to
be explicit feedback, though that's certainly one way to implement it.

>e. How can the FCC monitor or enforce this rule? Since this has to be

How does the FCC monitor or enforce any rule? (I think it's safe to
say that today, they don't). Seriously, it's one of those things where
if one isolated person doesn't comply but doesn't cause any trouble,
nothing is likely to happen. But if somebody causes real problems, or if
non-complying equipment becomes widespread, the FCC (not to mention the
rest of the amateur community) will hear about it.

>f. The Notice of Proposed Rule Making (Docket 97-12) simply states that
>Average transmitter power over 1 W shall be automatically adjusted to
>maintain an $E_b/(N_0 + I_0)$ ratio of no more than 23 dB at the intended
>receiver. There is no specification of the time period used to
>calculate the average, how often the receiving station has to make the
>measurements or if the receiving station has to notify the sending
>station immediately or on its next transmission.

This was deliberately omitted, because I wanted to make sure there was
enough flexibility to cover varying circumstances (such as the mobile
operation). Clearly, if you implement a system that has power control,
the time constant will be a parameter that can be tuned. And I can't
conceive of a system design that would create much of an incentive to
cheat on this parameter.

Phil

116. Re: [SS:1164] shannon limits

From: Phil Karn <karn@qualcomm.com>
Date: Thu, 13 Mar 1997 20:48:03 -0800 (PST)
To: ss@tapr.org
Message-ID: <199703140448.UAA22572@servo.qualcomm.com>
Rendered body type: text/plain

>where does this put the Shannon limit for a phone line (qv ANY channel)
>which is I believe a TOTAL max data rate of 30000 bps?

Obviously a "phone line" has a Shannon limit above 30,000 bps.

You have to define what you mean by "phone line". If you mean only the wire pair between your house and the telephone company, the capacity is potentially much greater than this. ISDN uses 1985 technology to routinely transmit 144 kb/s (two 64kb/s B-channels, a 8kb/s D-channel and a 8kb/s hardware control and framing channel) full duplex (i.e., 144 kb/s each way, simultaneously) over single copper telephone pairs up to 18,000' long. T-1 line drivers have done 1.5 Mb/s over pairs up to 5000-6000' since the early 1960s. And ADSL, if it ever arrives, promises several megabits/sec, depending on distance.

So if by "phone line" you mean a conventional *dialup voice* connection, the bottleneck is not in the access line, but at the central office. In nearly all modern digital switches the signals on the access line are digitized at 64kb/s as soon as they enter the switch, and they are switched and transmitted digitally at this rate. So obviously *any* modem designed for use over such a circuit could not possibly achieve a unidirectional throughput greater than 64kb/s (compression does not count).

The recently developed USR and Motorola high speed modems come awfully close to this 64kb/s limit through some good trickery, but they don't exceed it.

Phil

117. Re: [SS:1156] Re: Eb/(No+Io)

From: Phil Karn <karn@qualcomm.com>
Date: Thu, 13 Mar 1997 20:54:01 -0800 (PST)
To: ss@tapr.org
Message-ID: <199703140454.UAA22582@servo.qualcomm.com>
Rendered body type: text/plain

>could be instances where power control is not practical....such as
>EME...or maybe SS gets used to communicate to the amateur Mars mission ?
>1 watt probably isn't enough for either for those modes ?

Power control is entirely practical in EME. Why shouldn't it be?

It *is* true that the 100W limit may become an obstacle in deep space communications. I'd like to see a waiver of this limit, particularly for deep space operations where the ranging ability of SS is especially useful.

>Wouldn't you want to transmit the minimum amount of power needed up to the
>allowable limit within the hobby for the type of communications happening.
>Which Bob Nielson and some others have pointed is already covered in the
>rules.

Which are honored mainly in the breach.

>Power control is important, but does it need to be specifically mentioned
>in the SS section of the rules ? If SS is to be considered a mode like any

I agree, this is still a good question. The real issue is whether we need it to get the consent of the weak-signal, repeater and satellite guys. You know how hard this has been even with the proposed power control requirement. If you think you can get the FCC to approve the SS rules *without* the power control requirement, do so by all means.

>I think a more pressing issue will concern getting in-band ID accepted via
>the data stream transmitted. Just like packet and any of the othe digital

I agree. At the very least, if we must ID, it should not interfere when the SS signal itself would not.

>Also, of a more pressing issue is the frequency coverage. There will be
>demand to use SS systems below what the current rules allow. I think we

Yes. Given that the current NPRM proposes no additional SS bands, the original concession of proposing automatic power control doesn't buy us much, does it?

How about a compromise -- no automatic power control required on 70cm and up (where SS is already legal) but it is required for SS on the lower bands. And since there is no Part 15 equipment for those bands, there would be no need for a 1W grandfather limit -- which is arguably too

generous anyway.

Phil

118. Re: shannon limits

From: Eric Johnson <dej@edge.net>
Date: Thu, 13 Mar 1997 23:33:00 -0600
To: ss@tapr.org
Message-ID: <1.5.4.32.19970314053300.006c293c@edge.net>
Rendered body type: text/plain

At 06:40 PM 3/13/97 -0600, you wrote:
>On Thu, 13 Mar 1997 16:10:57 -0600 (CST), Dirk Koopman wrote
>
>>As some of you may have noticed US robotics have introduced a modem which
>>appears to able to achieve information transfer speeds of 57600 bps in one
>>direction and (AFAIK) back channel speeds of 14400 bps. Now add to the
>>undoubted existence of modems capable of 33600 bps in both directions -
>>where does this put the Shannon limit for a phone line (qv ANY channel)
>>which is I believe a TOTAL max data rate of 30000 bps?
>
>If found guilty of violating physical laws I hope they will be severely
punished.
>
>No, really. I think they depend on some small percentage of phone lines
>being better than average to support 56k. Most users will not get that kind
>of throughput.

It based upon the fact that the service provider must have digital lines (ie
T1 or ISDN) feeding a bank of 'DIGITAL' modems (oxymoron?). This makes your
local loop the only analog circuit. The distortions in a single
digital/analog conversion can be better compensated for than an
analog/digital/analog signal conversion. So in effect they are changing the
S/N ratio in Shannon's equation. Whenever you think it is as fast as it will
go they change the rules. The December 96 IEEE Communications magazine has
the details. Most users should expect speeds at about 48k.

--Eric
dej@edge.net

119. Re: [SS:1170] Re: Eb/(No+Io)

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Fri, 14 Mar 1997 01:28:24 -0600
To: ss@tapr.org
Message-ID: <v03007888af4e8f6192b2@[208.134.134.40]>
Rendered body type: text/plain

Hi Phil.

>>Power control is important, but does it need to be specifically mentioned
>>in the SS section of the rules ? If SS is to be considered a mode like any
>
>I agree, this is still a good question. The real issue is whether we
>need it to get the consent of the weak-signal, repeater and satellite
>guys. You know how hard this has been even with the proposed power
>control requirement. If you think you can get the FCC to approve the
>SS rules *without* the power control requirement, do so by all means.

Well, it is going to depend on the many of us that filed before and those
that can get involved now making sure that we file well written and
informed comments and future reply comments making the points regarding
expanded freq operations, IDing issues, and power control. The FCC will
then look over all the comments.

As can be seen in the current docket, the well written technical comments
filed -- by many of the group here -- went to make up the current wording.
Those comments that seemed xenophobic in nature were added to the record,
but didn't truly effect the current wording in the docket presented.

I believe that the comments filed by those against SS as a mode by other
elements of the hobby itself (strange -- but that is another topic for
discussion) would have still been filed the same way with or without the
power control issues being included. Power is just one point on the ranges
of issues regarding their fear of this mode.

The wording about Eb/No which came from the FutSys meeting in Dallas at the
DCC and later discussion was in the ARRL request and the current Docket.

Those against SS for the most part don't care about the technical issues -- they just don't want the mode given expandability to be made into a real operational mode. Power control is in the docket as a bone to the Part 15 companies and to a lesser extent some within the amateur community in regards to potential interference that may or may not ever be generated.

>>I think a more pressing issue will concern getting in-band ID accepted via
>>the data stream transmitted. Just like packet and any of the other digital
>
>I agree. At the very least, if we must ID, it should not interfere when
>the SS signal itself would not.
>
>>Also, of a more pressing issue is the frequency coverage. There will be
>>demand to use SS systems below what the current rules allow. I think we
>
>Yes. Given that the current NPRM proposes no additional SS bands, the
>original concession of proposing automatic power control doesn't buy us
>much, does it?
>

With docket 97-12, this is our opportunity to get everything we need or want on the table. These being the Freq issue (50Mhz and up at least), the ability to ID in-band in the data stream, and the issue involved with power control.

In regards to power control. I guess my only concern is the setting of some arbitrary limit. Things change and this is suppose (in theory) to be an experimental hobby. If we set power control limits in the rules now, we will have them for a long time. Are we REALLY sure what we are getting in the rules is what we REALLY want? While there might be no problems with the limits set, there might be serious problems encountered in 5 years that would then not be able to be gotten around. Trying to change the rules on this issue in a few years will not be an option.

What does "(g) The transmitter power output must not exceed 100 W under any circumstances. If more than 1 W is used, automatic transmitter control shall limit output power to that which is required for the communication. This shall be determined by use of the ratio, measured at the receiver, of the received energy per user data bit (Eb) to the sum of the received power spectral densities of noise (No) and co-channel interference (Io). Average transmitter power over 1 W shall be automatically adjusted to maintain an Eb/(No+Io) ratio of no more than 23 db at the intended receiver ." mean in communications systems we could make operational tomorrow? Will this add additional cost to something that AMRAD, AMSAT, or TAPR might do as to make it not cost effective to implement to allow amateurs to get involved in some common project -- although another means of power control could be implemented that works as well, but wouldn't meet the rules as outlined?

Does this mean that we will be limited to certain technology (hardware implementations) which implements what we need to determine this -- but what happens in 2-5 years when the technology moves forwards to such an extent (single chip solutions for commercial applications) that we might not have access to the information anymore to make this work? and can't afford to get custom stuff rolled to implement what we need.

The problem we seem to have in amateur radio whenever there is a rulemaking process to try to simplify the rules -- we get more rules added. We need to have the simplest rules possible so as to allow the greatest flexibility in the hobby for what people want to design and experiment with. Having the greatest flexibility in the rules will stop people like yourself, Jeff, or even myself from saying -- we could always abandon Part 97 for some other rules area? Right? Hasn't the restriction imposed by various parts of the rules caused this to be said? Why limit us now when we have the chance to make things simple again and to help advance a major area of the hobby's potential future?

We are changing for the most part from a communicators hobby back into more of a technical, experimental, and skilled operational hobby over the next ten years. I have written a lot in the PSR about my feelings on this issue -- so I will not take up bandwidth here -- but the point being that any rules we ask for need to be the simplest possible so that they are the most flexible in the future.

The FCC has stated that they plan on issuing fewer and fewer STAs in the future. Getting the current TAPR STA was a long process with a lot of resistance in some parts of the FCC as to it be granted. Part 5 rules are being re-written in order to make it more flexible, but will the eventual

rules changes be of benefit to our hobby ? I don't know, because a lot of it is being focused on commercial operational flexibility for testing systems. We better not depend on STAs or other mechanisms in the future to be able to implement systems that are required to expand our hobby.

>How about a compromise -- no automatic power control required on 70cm and
>up (where SS is already legal) but it is required for SS on the lower
>bands. And since there is no Part 15 equipment for those bands, there
>would be no need for a 1W grandfather limit -- which is arguably too
>generous anyway.

Okay. Let's think about this.

Why have an above 1 watt power control limit in one part of the spectrum and not the other ?

If anything, we agree to the above 1 watt requires power control of some fashion, but why not drop the technical specification on how that power control is determined. If we are transmitting above 1 watt then the radio must have a way to control the power output as to try to use the minimum amount of power to maintain communications.

Maybe we just need to ask for power control above 1 watt on bands where the unlicensed Part 15 devices operate ? That would limit the biggest threat (as seen by the Part 15 companies) -- that of amateurs getting Part 15 equipment and jacking the power up without any power control. Isn't that one of the biggest worries from the commercial sector? I can't see them being worried about the number of amateurs that might ever get operational with this mode on their spectrum. Nothing we could do can ever compare to the ever increasing noise and interference problem they are generating for themselves with there own equipment.

I can just see in a year or two that TAPR or someone else comes out with a radio that implements something and we get ambushed by the amateur radio appointed 'legal' community, because we do implement power control, but the implementation could be challenged as not strickly following the rules as they are currently put forward.

The issue on power control becomes this.

We agree that we want power control, but does it indeed need to be in the rules covering SS modes by itself. If SS as a mode must have power control limits then every other mode in amatuer radio should be required to meet the same technical requirements.

If it has to be in the rules (for whatever reasons -- to keep people happy, to be a good sharing partner, etc), then does it need to be specified to the extent of technical wording we have in the current rules. Maybe just asking for power control above 1 watt be implemented with the purpose of reducing output power to its minimum and therefore reducing potential interference to other users sharing the same spectrum area ?

If we make the unlicensed Part 15 companies happy and then rule making is probably okay -- although personally I don't think any amount of power control is going to make them happy either. Part 15 systems are operating at the bare minimum -- 10-15db processing gain...right ? Any additional signal presence is going to be a problem to some of these systems. One reason they are having problems with each other more then any other service already operating in the same spectrum. They don't want to see more flexible amateur spread spectrum rules, because that will make many of the bands we are under utilizing more attractive for us to implement systems on. The reason being that many of the Part 15 devices really hurt traditional modes we like to use... but if we implement quality SS systems then we shouldn't be bothered by them or us bothering them, thus making certain bands more attractive then they are now.

As to power control on other amateur freqs, why ? We have rules that govern interference and power issues. Our license doesn't guarantee us an operating mode or frequency -- does it ? It just allows us to operate different modes on different bands as a hobby. What we want to make sure is that we design systems that are friendly in whatever environments they are operating -- one reason modes and operating practices have changed over time.

My last words -- I promise :-)

If we implement rules to restrict the people that abide by the rules -- no matter if the restrictions are technically feasible or not -- those that are going to break them will break them no matter what the rules said. They are already breaking the rules, why limit the folks that try their best to follow the spirit of amateur radio, by having additional rules that just say what is already in other parts of the rules ?

Thus, the rules need to think about those that are going to build good systems no matter what the rules say, without limiting how that is accomplished beyond general guidelines.

Lots to think about.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

120. Re: [SS:1169] Re: shannon limits

From: Dirk Koopman <djk@tobit.co.uk>
Date: Fri, 14 Mar 1997 08:47:07 +0000 (GMT)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970314081610.6223C-100000@dirku.tobit.co.uk>
Rendered body type: text/plain

On Thu, 13 Mar 1997, Phil Karn wrote:

> >where does this put the Shannon limit for a phone line (qv ANY channel)
> >which is I believe a TOTAL max data rate of 30000 bps?
>

[snip]

> So if by "phone line" you mean a conventional *dialup voice*
> connection, the bottleneck is not in the access line, but at the
> central office. In nearly all modern digital switches the signals on
> the access line are digitized at 64kb/s as soon as they enter the
> switch, and they are switched and transmitted digitally at this rate.
> So obviously *any* modem designed for use over such a circuit could
> not possibly achieve a unidirectional throughput greater than 64kb/s
> (compression does not count).
>

Yes, but...

a) I thought they were still deliberately limiting AF bandwidth to 300-2700 Hz. Is this still actually the case? (I understood it was).

b) as these modems are analog, Nyquist - he say - need at least two samples per cycle to reproduce waveform. What is the underlying baud rate used on these systems?

> The recently developed USR and Motorola high speed modems come awfully
> close to this 64kb/s limit through some good trickery, but they don't
> exceed it.

Although the underlying baud rate won't be anything like 32K baud (which definitely wouldn't go thru the analog filters), at first sight 57.6Kbps * 2 = 115.2Kbps (which I know isn't the correct way of looking at it), but I still can't work out how I really should look at it.

Not that I shall use one as I am going over to ISDN (invented by BT and then, as usual for Britain, abandoned for others to notice how useful it was!) because I can't be bothered to wait ANOTHER 20 seconds (over and above the 20 odds seconds I currently wait) for the modem to decide that it only wants to connect at 21600 bps... (the Teles ISDN cards in a Linux box work REALLY well, < 3 seconds from dial to full PPP set up @ 64 or 128 Kbps and only STG 79 here which probably means \$79 in the US (<http://www.teles.de>)).

But I still would like to know HOW it is done (all commercial secrets kept).

Still confused of Dereham..

--

Dirk-Jan Koopman Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than
the piano when played by a sister or near relation." --Oscar Wilde

121. Re: [SS:1169] Re: shannon limits

From: Mike Cheponis <mac@wireless.com>
Date: Fri, 14 Mar 1997 01:07:29 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.BSD/.3.91.970314004049.19556D-100000@ns1.culver.net>
Rendered body type: text/plain

On Thu, 13 Mar 1997, Phil Karn wrote:

> The recently developed USR and Motorola high speed modems come awfully
> close to this 64kb/s limit through some good trickery, but they don't
> exceed it.

Indeed! In fact, a friend says that telco steals the LSB of one of the 8-bit
u-law-coded audio samples periodically for signalling, so the Absolute Max
data rate through the PSTN is < 64,000 b/s.

But to consider what a feat this is, consider that these USR and Motorola
modems have to become essentially _inverse_ u-law codecs! They have to
carefully probe the channel to measure the codec responses! It's awesome,
really...

...until you realize that this DSP MIP-fest is needed because, for whatever
reason, the US PSTN is still delivering _analog_ lines from the CO to your
home/business, even as everything else in the phone system is digital...sad...

But, since this list is supposed to be for SS, let me pose this question
to the group:

How do we obey the power limits proposal in a "broadcast" type SS usage,
for example, sending bulletins or with an SS repeater?

In the case of the repeater, do we set the power level of the repeater to
be high enough for the weakest user in a roundtable? (Else he won't hear
what's being repeated!)

What do you do when you send "CQ" on SS? Turn the wick up to 100 W and then
backoff when somebody answers?

And how do you implement my favorite SS application, the Promiscuous Radio:
You set a "bit vector" of the kinds of things in which you are interested
into your SS radio. For example, you want to talk with (or perhaps more
generally, communicate with - because it can be voice, data, video, 3D
projection, shared Virtual Reality, etc...) people who are interested in
SS EME, 24 GHz contesting, and backpacking, but NOT in HF phone contests or
basketweaving...etc.

Now, you want to send a "Buddy CQ" from your SS radio with your bit vector,
and you want to have your "Enhanced Bit-Vector Squelch" open when a person
with the suitable XOR of your and his/her bit vectors is within communications
range. (Of course, there may need to be further exchanges between the
radios before the paired squelches open, just to do further qualification, as
in a hierarchy, but this is just a detail...)

So am I allowed to pump 100W into a big antenna during these "Buddy CQ" calls?

I don't have answers, I'm hoping some of our esteemed list members do!

73 -Mike K3MC

122. Confused - again!

From: RLANIER@mailb.harris.com (RLANIER)
Date: Fri, 14 Mar 1997 09:33:06 -0500
To: ss@tapr.org
Message-ID: <32961f20@mailb.harris.com>
Rendered body type: text/plain

Why do we get such a strong response about something that has nothing to do the SS design? I'm refering to the discussion about the Shannon limit using phone line modems.

If we are ever going to met the deadline, lets discuss a real, working SS design - one that ALL hams of all technical levels can appreciate.

Tony KE4ATO

123. Re: [SS:1175] Confused - again!

From: Dirk Koopman <djk@tobit.co.uk>
Date: Fri, 14 Mar 1997 15:32:40 +0000 (GMT)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970314152726.22710D-100000@dirku.tobit.co.uk>
Rendered body type: text/plain

On Fri, 14 Mar 1997, RLANIER wrote:

> Why do we get such a strong response about something that has nothing
> to do the SS design? I'm refering to the discussion about the Shannon
> limit using phone line modems.
>
> If we are ever going to met the deadline, lets discuss a real, working
> SS design - one that ALL hams of all technical levels can appreciate.
>
> Tony KE4ATO

I received this quote in the very next e-mail just after the above. I wonder whether it is a portent or just a delicious coincidence:

"Propose to any Englishman any principle or any instrument, however admirable, and you will observe that the whole effort of the English mind is directed to find a difficulty, a defect or an impossibility in it. If you speak to him of a machine for peeling a potato, he will pronounce it impossible; if you peel it before his eyes, he will declare it useless because it will not slice a pinapple." - Charles Babbage.

Dirk

--
Dirk-Jan Koopman Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than the piano when played by a sister or near relation." --Oscar Wilde

124. Re: [SS:1173] Re: shannon limits

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Fri, 14 Mar 1997 10:43:05 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.91.970314103858.18732A-100000@tekdata.com>
Rendered body type: text/plain

As far as the USR 56K modems go: three short comments.

USR States:

1. A typical 33.6KBs modem is actually an asymmetrical device, it switches the direction of the pipe depending on demand. So according to USR (3com?) this is how you can pump the 33.6 KB/s over the line.

2. The ISP (or transmitting?) end of the 56K link has to be a digital line, like a T-1 or ISDN. The ISP modem is pure digital, like was stated before this raises the effective S/N in that direction in Shannon's law..

3. In USR's advertising they state "the modems are capable of 56K thruput, but due to current FCC regulation they are limited to 53K" Caveat Emptor..

Fred M. Spinner, KA9VAW
fred@tekdata.com

125. Re: [SS:1174] Re: shannon limits

From: Tony McConnell <n3jly@erols.com>
Date: Fri, 14 Mar 1997 13:49:16 -0500
To: ss@tapr.org
Message-ID: <199703141849.NAA15865@smtp1.erols.com>
Rendered body type: text/plain

>Indeed! In fact, a friend says that telco steals the LSB of one of the 8-bit
>u-law-coded audio samples periodically for signalling, so the Absolute Max
>data rate through the PSTN is < 64,000 b/s.

the LSB is robbed every 8th sample in a system that uses SF(such as D4). in an
ESF system that bit is not robbed.

8,000 samples per second, 8 bits per sample, 64,000 bps, one DS0 in Extended
Super Frame.

126. Re: CWID, Pwr rulemaking

From: morganb@inetport.com (Robert B. Morgan)
Date: Fri, 14 Mar 1997 16:13:39 -0600 (CST)
To: ss@tapr.org
Message-ID: <199703142213.QAA25790@admin.inetport.com>
Rendered body type: text/plain

IN reply to Greg and Phil, on Power control and CW ID philosophy,
also to Mike C. on broadcast mode power control. Upon proofreading, it was
so lengthy I split it into 3 parts, this is part 1 and is continued to 2
other files. This chunk is the CWID topic. Possibly this verbage
may be useful later on in making up official rulemaking comments, that
is one of the thoughts I had in mind in putting this into print.

>

>>I agree. At the very least, if we must ID, it should not interfere when
>>the SS signal itself would not.

U beat me to it. I was going to raise the question the other day, as to how
much more interference would be generated by the CWID itself, presuming
that it would be some sort of narrowband emission in the middle of some
SS activity. (Tongue in cheek, I would also ask if it had to follow
the existing rule of minimum power to maintain the desired communication.
Since it has little or no value, ramp it down about 90 db)

>From a practical standpoint, what is the purpose of the CW ID? Presumably
it would be to inform someone that an amateur was lurking about on the freq.
When in the narrowband environment, like AX25 in the early days,
a listener could observe the CWID and possibly correlate it to the
presence of a packet signal about the same strength, freq, chirp
characteristics, antenna direction, etc, and possibly conclude that
the packet signal belonged to the station transmitting the CW ID, since it
came from the same transmitter and probably the same modulator, particularly
if it was implemented as AFSK. In the SS environment, there will
be little or no correlation between a presumed narrowband CWID and
whatever SS is being sent. In the case of the chipset radios, it probably
wouldn't even be coming from the same transmitter. So what's the value,
other than to transmit a narrowband ID? And then accept the added
interference it causes. (Really it just sounds like a roadblock to us).
On a cost/benefit analysis, it would appear to fail for total lack
of any conceivable benefits, and at a conceivable added cost of adding
parallel narrowband transmitters to the SS gear, while reducing throughput.

Related question: who is going to be listening for it? Probably nobody.
For that matter one might be hard pressed to even find a radio for some
of these frequencies that included an audio chain and speaker that
would recover conventional analog modulation that could copy CW,
and then you have to worry about format: A1, F2, etc....
And I won't even touch the question as to how many CW ops we may
have nowadays that could read it. Maybe if we get stuck with it,
we can transmit it at 115kB or whatever, computers can copy CW
if programmed to do so.

We have been down this road before. I ran CWID on my TNC1 for awhile.
I don't recall of hearing of a single instance where it was found to
be useful to anyone at anytime, ever. It certainly took extra work
to implement. It certainly did interrupt routine higher speed packet
during the time it was being transmitted. I think we have to draw
on this history as an argument to delete this requirement. I think that
our response to this issue has to be based on 1) history of its use
in the AX25 environment and 2) cost/benefit.

This isn't to say that identification isn't necessary. It ought to be a part of the datastream, as we now think of it on packet or any other mode. If you can interpret the modulation, you ought to be able to recover an ID. If you can't interpret the modulation, then either you don't even know it is there in the background and don't have any reason to investigate it, or you are undergoing such an extreme case of QRM that you need to locate it as an interference source. Amateurs have various techniques to locate interference. Most of the good ones are best suited to narrowband sources, SS direction finding is not really developed in the amateur bands. I was hoping to make this one of my goals under the STA, but the infrastructure hasn't got off the ground. Frankly, if I had to "locate" a Freewave, I would probably have to be in the same room with it. I did perform antenna range testing with one, but it had to be locked in the continuous transmit mode to do so, at which time I could "locate" it within the back yard. Good SS really is unobtrusive. I think that is how we have to sell it.

As for actually being able to copy in-stream ID, which I think would be desirable for amateur uses, I suspect it may be difficult to eavesdrop with the common chipsets that may be available, since they are aimed at a mass market of private communications. Unless you know the spreading codes at the least, you won't be able to recover the modulation. So even here, we have to be careful about requiring it be available. If we can't find economical means of doing it, how can we write rules to require it?

Continued next msg with power issues.

Bob Morgan WB5A0H
Austin Texas
morganb@admin.inetport.com

127. Re: power control rulemaking

From: morganb@inetport.com (Robert B. Morgan)
Date: Fri, 14 Mar 1997 16:13:44 -0600 (CST)
To: ss@tapr.org
Message-ID: <199703142213.QAA25799@admin.inetport.com>
Rendered body type: text/plain

Continued from last msg, re: Greg and Phil's conversation, (2/3)

Now for power control, and I would like to make the case for a very broad rule, preferably keeping the existing rule we have now, the minimum power necessary rule. Personally I think that the existing power control rule is sufficient for regulatory purposes. Certainly I favor the use of auto power control where it is appropriate. I have seen lots of cases on 9600b packet in trying to keep trunks on dedicated channels operational, during band openings throughput actually gets worse, and power control would probably help.

>

>With docket 97-12, this is our opportunity to get everything we need or want on the table. These being the Freq issue (50Mhz and up at least), the ability to ID in-band in the data stream, and the issue involved with power control.

>

>In regards to power control. I guess my only concern is the setting of some arbitrary limit. Things change and this is suppose (in theory) to be an experimental hobby. If we set power control limits in the rules now, we will have them for a long time. Are we REALLY sure what we are getting in the rules is what we REALLY want? While there might be no problems with the limits set, there might be serious problems encountered in 5 years that would then not be able to be gotten around. Trying to change the rules on this issue in a few years will not be an option.

>

>What does "(g) The transmitter power output must not exceed 100 W under any circumstances. If more than 1 W is used, automatic transmitter control shall limit output power to that which is required for the communication.

As for 100W, and assuming terrestrial or near-earth satellite uses, I have no problem with a 100W limit. But there are amateurs who engage in EME, and maybe some of them might want to use SS, at least in light of the ranging capabilities and possibly to take advantage of some processing gain. What conceivable objection could there be to an exemption for deep space (lunar and beyond) SS up to the 1 KW limit, as long as directional antennas are used that are pointed out to space? (That probably means rule language specifying antenna pattern and elevation or something). Most if not all of these folks already employ the largest

arrays in use now. This also might raise an issue of a new application that hasn't been seen too much: amateur terrestrial radar. (I knew at least one ham about 25 years ago that did acquire some surplus radar gear with the intention of using it as such-I don't know that outcome).

>The problem we seem to have in amateur radio whenever there is a rulemaking
>process to try to simplify the rules -- we get more rules added. We need
>to have the simplest rules possible so as to allow the greatest flexibility
>in the hobby for what people want to design and experiment with.

Well said. Why do we keep coming up with restrictions on ourselves?
Every other lobbyist writes suggested rules with as many loopholes
as imaginable.

>>How about a compromise -- no automatic power control required on 70cm and
>>up (where SS is already legal) but it is required for SS on the lower
>>bands. And since there is no Part 15 equipment for those bands, there
>>would be no need for a 1W grandfather limit -- which is arguably too
>>generous anyway.

>

>

>Okay. Let's think about this.

Can we write a rule that makes sense that will require auto power control
if and where technically feasible at the time of design of the equipment
in use? Possibly relating to all uses, not just SS? And refrain from
further technical details? (And I have little comments on the abuses
that might exist on 20M SSB DX, other than to say that we have a
rule requiring minimum power already).

>

>Why have an above 1 watt power control limit in one part of the spectrum
>and not the other ?

>

>If anything, we agree to the above 1 watt requires power control of some
>fashion, but why not drop the technical specification on how that power
>control is determined. If we are transmitting above 1 watt then the radio
>must have a way to control the power output as to try to use the minimum
>amount of power to maintain communications.

>

>Maybe we just need to ask for power control above 1 watt on bands where the
>unlicensed Part 15 devices operate ? That would limit the biggest threat
>(as seen by the Part 15 companies) -- that of amateurs getting Part 15
>equipment and jacking the power up without any power control. Isn't that
>one of the biggest worries from the commercial sector? I can't see them
>being worried about the number of amateurs that might ever get operational
>with this mode on their spectrum. Nothing we could do can ever compare to
>the ever increasing noise and interference problem they are generating for
>themselves with there own equipment.

Sounds good on the surface. The scary thought that popped into my mind
when I read it is that suppose we require part 97 to include auto power
control wherever part 15 is present. Let that appear in the rules for
a year or two, and probably without any adverse consequences. Then along
comes some equipment manufacturer's lobby, and proposes some
new part 15 systems, and lo and behold they cover every existing
amateur band from 160 to light. At that point we might have our whole
part 97 effectively closed down for good, stolen right out from under us.
So lets be extremely careful.

>I can just see in a year or two that TAPR or someone else comes out with a
>radio that implements something and we get ambushed by the amateur radio
>appointed 'legal' community, because we do implement power control, but the
>implementation could be challenged as not strickly following the rules as
>they are currently put forward.

If we don't write technical requirements, they can't be challenged,
at least from a technical standpoint.

The "minimum necessary" rule can still work. Obviously some implementations
will perform better than others. Those that work better will probably
be better accepted. Maybe the really bad implementations would fall
into disfavor and would be used less. The "minimum necessary" rule, for
the most part, puts the burden of proof of a power abuse violation
on an outside observer, not the operator. Hard and fast rules, aside
from being inflexible in the face of advances in technology, tend to put
the burden of proof on the operator, and may tend to require continual
upgrades or modifications, or maybe obsolesences, as technology
improves.

>If we implement rules to restrict the people that abide by the rules -- no
>matter if the restrictions are technically feasible or not -- those that
>are going to break them will break them no matter what the rules said.
>They are already breaking the rules, why limit the folks that try their
>best to follow the spirit of amateur radio, by having additional rules that
>just say what is already in other parts of the rules ?

Well put. As was pointed out earlier, the FCC isn't enforcing much of anything, at least after the rulemaking and equipment design and approval stage (i.e. field enforcement). That is the old story of the lowest common denominator politics at work: penalize the majority for the ill deeds of some few, where what might be needed is to penalize or correct the ill deeds. I will butt heads with that type of politics to my last day on earth. Anyhow it is stupid to write more rules in response to the violations of existing rules that have not been enforced, but could have been. If it was illegal, then it was illegal whether or not it is made "more" illegal.

My considered opinion is to keep the existing rule we have on power control: run the minimum necessary to maintain the desired communication. Unless we can come up with some creative and foolproof language, I wouldn't want to specify any means. This is one field where technology will always outpace rulemaking, and we don't have the funds to routinely support rulemaking lobbying, so we will be stuck with whatever we ask for and receive.

Bob Morgan WB5A0H
Austin Texas
morganb@admin.inetport.com

128. Re: broadcast mode power control

From: morganb@inetport.com (Robert B. Morgan)
Date: Fri, 14 Mar 1997 16:13:49 -0600 (CST)
To: ss@tapr.org
Message-ID: <199703142213.QAA25808@admin.inetport.com>
Rendered body type: text/plain

Now some thoughts on broadcast, etc issued on power control, quoted from: Mike Cheponis <mac@wireless.com>

>How do we obey the power limits proposal in a "broadcast" type SS usage,
>for example, sending bulletins or with an SS repeater?
>

>In the case of the repeater, do we set the power level of the repeater to
>be high enough for the weakest user in a roundtable? (Else he won't hear
>what's being repeated!)

I don't know any other mechanisms, except that which has already been mentioned of intermediate repeating. Possibly a really, really good broadcast mode power control algorithm would be able to trade off higher power vs. intermediate repeats to the weaker users. More practical would be the existing approach of the weaker station manually specifying a repeater, assuming that the protocol provides the mechanism. A decent system on a repeater or hub, serving for instance 5 users, ought to be running separate power control with each user, if it is sending (and duplicating) point to point data to each. But if it is a broadcast method, it obviously has to provide the power necessary to reach the user experiencing the most loss or noise level. Of course, note the tradeoff between running more average power on a broadcast method, vs the additional time required with multiple point to point links sending, and duplicating data, or vs intermediate repeats.

As a few of us have already discovered in using the STA Freewave radios, BROADCAST modes are going to perform much different than the point to point modes, and our experience so far has been that there is a LOT of improvement required in this area. They really didn't work worth a hoot. This issue is one of them. (The Freewave radios didn't implement power control as far as I could see on the wattmeter-scope. At 400 mW they probably weren't forced to, aside from the issue of it being desirable at most times).

Since hams use broadcast modes like CQ's and roundtables, and quite a few legitimate net uses need broadcast modes, like files of common interest, network routing, etc., we want to leave room in our rules to provide for their use. These rules simply must NOT be written with point-to-point mechanisms in mind, since point to point mechanisms are inherently unsuited to broadcast type modes. The governing factor must be to minimize interference and facilitate communications, not just

implement point to point algorithms.

Broadcast modes are probably of more use to amateurs than the general clientele of commercial SS, but it isn't exclusive to us. However this is an area where we might be able to make original contributions to the state of the SS art. There is a lot of room for improvement here.

>

>What do you do when you send "CQ" on SS? Turn the wick up to 100 W and then
>backoff when somebody answers?

Under the existing rule of running the minimum power to maintain communications, that is how I interpret it under some circumstances. Almost any scheme I can imagine, including existing amateur practice using manual means that we have been used to for years, suggests that if there are signals on the band, and your CQ isn't responded to with 1W, then try 10, or 100, or 1000. If the band was dead, then it takes one CQ by somebody, for anybody to notice that the band has come back to life, so everybody hops back on the air.

There are probably some open loop means of power control, but most algorithms have to be based on the principle of turning it up high enough to establish contact (usually a shorter duration process) and making measurements and adjusting based on those measurements. The "better" ones are probably going to continue the adjustment process on every transmission, where it really counts during the high duty cycle part of the file transfers and the like.

Most digital CQ's are by nature going to be extremely short transmissions, just the bare minimum to get the transmitter on the air, and allow the sync mechanisms to work, and send a little bit of ID data. They aren't exactly large file transfers. It ought to be remembered that the undesirable effects of interference are manifested by interference over time. The shorter and less frequent the transmission, the less QRM it causes. I can certainly confirm that aspect experimentally from a qualitative viewpoint from playing with the Freewave radios a little.

>So am I allowed to pump 100W into a big antenna during these
"Buddy CQ" calls?

I would certainly think so, unless we write language to the contrary.

There is one more fly in the ointment: multipath. If present, more power does no good. You simply are competing with your own signal. The algorithms that measure Eb/No+Io had better be capable of spotting the difference, else they will just ramp up to max and stick there. I suspect that this problem has been solved already, we just have to remember to use algorithms that have solved it. It never enters into our old voice analogies of amateur operating. It only adversely affects data, and maybe ATV.

Remember, the FCC doesn't do much monitoring any more. The person that is in the best position to judge as to how much power to run is the operator himself. Or better still his auto-power control algorithm. Any other outside observer isn't subject to the same set of conditions (i.e. the FCC monitoring van parked out front might not be measuring the QRM caused remotely by a neighbors cordless phone or leaky microwave oven that is causing our hypothetical operator's algorithm to have to turn up the juice to overcome it). There isn't going to be any field enforcement unless it is an extreme case, first because they are about out of that business, and second because you need good proof to disprove the operators judgement.

Bob Morgan WB5A0H
Austin Texas
morganb@admin.inetport.com

129. Re: [SS:1178] Re: shannon limits

From: Phil Karn <karn@qualcomm.com>
Date: Fri, 14 Mar 1997 16:00:17 -0800 (PST)
To: ss@tapr.org
Message-ID: <199703150000.QAA26972@servo.qualcomm.com>
Rendered body type: text/plain

>the LSB is robbed every 8th sample in a system that uses SF(such as D4). in an
>ESF system that bit is not robbed.

>8,000 samples per second, 8 bits per sample, 64,000 bps, one DS0 in Extended
>Super Frame.

This is why 56kb/s became such a popular data rate in the US for leased lines. Rather than figure out which samples have their high order bits robbed, you just toss *all* of the high order bits, leaving 7 bits of each byte for data. $7/8 * 64\text{kbps} = 56\text{ kbps}$.

Even with unknown bit robbing phasing you could get back at least part of the difference between 56 and 64kbps by using FEC that treats the robbed bits as errors and corrects them.

Phil

130. Re: [SS:1179] Re: CWID, Pwr rulemaking

From: Richard Green <rtg@nuge.com>
Date: Sat, 15 Mar 1997 00:24:01 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970315001254.7399A-100000@lindy.nuge.com>
Rendered body type: text/plain

On Fri, 14 Mar 1997, Robert B. Morgan wrote:
> ... I was hoping to make this one
> of my goals under the STA, but the infrastructure hasn't got off the
> ground. Frankly, if I had to "locate" a Freewave, I would probably have
> to be in the same room with it. I did perform antenna range testing with
> one, but it had to be locked in the continuous transmit mode to do so,
> at which time I could "locate" it within the back yard. Good SS really
> is unobtrusive. I think that is how we have to sell it.

It can be done... I seem to remember an article many years ago in the AMRAD journal, back when they were experimenting with FHSS, about an SS hidden transmitter hunt they held in the D.C. area. The local FCC field office sent some of their field engineers to join in the fun, and they won it hands down! So much for the amateurs 'leading the technology'. The FCC boys had no trouble finding the hop codes and sync'ing clocks, even though they started the chase with less information about the target than the club members had been given!

Richard Green
Ann Arbor, MI

131. Re: [SS:1183] Re: CWID, Pwr rulemaking

From: Jeff King <jeff@mich.com>
Date: Sat, 15 Mar 1997 01:03:28 -0500
To: ss@tapr.org, ss@tapr.org
Message-ID: <2.2.32.19970315060328.00d5c2ac@mail.mich.com>
Rendered body type: text/plain

At 10:55 PM 3/14/97 -0600, Richard Green wrote:

> It can be done... I seem to remember an article many years ago in the
>AMRAD journal, back when they were experimenting with FHSS, about an SS
>hidden transmitter hunt they held in the D.C. area. The local FCC field
>office sent some of their field engineers to join in the fun, and they won
>it hands down! So much for the amateurs 'leading the technology'. The
>FCC boys had no trouble finding the hop codes and sync'ing clocks, even
>though they started the chase with less information about the target than
>the club members had been given!
>
>Richard Green
>Ann Arbor, MI
>

Hiya Rick!

You can find references to these tests in the ARRL spread spectrum compendium. Look on pages 7-6, 8-8 and 8-26. One of the complaints the FCC agents had was they would have taken less than 25 minutes to find them if traffic had not been so heavy!

One might want to mention these tests in filings on the NPRM in objection to the CWID.

-Jeff

132. Re: [SS:1181] Re: broadcast mode power control

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Sat, 15 Mar 1997 07:29:29 -0500
To: ss@tapr.org

Message-ID: <2.2.32.19970315122929.00387e94@mindspring.com>

Rendered body type: text/plain

To continue the thought process:

One of the potential applications that could be implemented in spread spectrum is a replacement for the existing channelized narrow-band FM repeater systems used by amateur operators today. Such a system would operate similar to the existing FM NB repeaters, but be implemented with SS. "Channelization" would be implemented by use of orthogonal spreading codes. An example of such a system could probably be easily prototyped today using 900MHZ SS cordless phone components.

The proposed automatic power control requirement would not allow the operation of such a system.

The existing FM repeater systems operate under the minimum necessary power ruling. They correctly presume the power required is that needed to provide adequate signal strength in their coverage area. Operating this way, if there are only near-by users, they are using more power than would be required by the rules. However, there may be a distant third user, at the limits of the coverage, hidden from the near-by users, wanting to join the exchange, so power must be sufficient to provide adequate signal strength at his location so the distant operator knows when to transmit. The voice repeater system is CDMA in the sense that the operator detects carrier and keys up when it is gone.

However, in the proposed ruling, transmit power is dependent on received signal strength. In the example above, if the repeater were using only enough power to maintain communications with the near-by operators, the distant operator would not be able to detect the on-going exchange and could interfere with it when he transmits.

Therefore, a more workable ruling would be to not add a new rule governing SS modes, but to allow SS modes to operate under the existing minimum power necessary rule.

Lee W. Fry AA0JP

lfry@mindspring.com

See my Part 15 Spread Spectrum Device Compendium at:

<http://www.mindspring.com/~lfry/part15.htm>

133. Designing Repeaters in SS

From: n5owk@n5owk.ampr.org

Date: Sat, 15 Mar 97 08:10:24 CST

To: ss@tapr.org

Message-ID: <495@n5owk.ampr.org>

Rendered body type: text/plain

Lee has an interesting point there about the current FM NB repeater. It is sure to be a comment in someones reply to the FCC. But I don't favor that design at all. I'm somewhat surprised that with the cheap components available now, even the "damned" paging systems still keep that model. They synchronize those carriers to mere Hz, and link them all together so they cover the whole state with the same data. Just a complete waste of spectrum. With a couple hundred milliwatts the same task can be performed. Using the cellular model, the pager could announce its position (ramp up in power till someone replies).

But the Ham repeater was obsolete in the early 80's when trunking was deployed. Real people don't waste spectrum like that anymore. Only a socialist or a communist would favor such a system (the society as a whole pays for the spectrum, so the elite can access for free). There's nothing wrong with a communist or a socialist, but I made a pretty good living killing them in the post-Vietnam wars :-)

We're talking very high bandwidth. Undreamed-of bandwidth. To channelize a high power SS radio and continue the low bandwidth model is sheer lunacy. I should be able to put an antenna on the roof, and the device negotiate and resolve a map. This map, using cheap memory could develop a two-dimensional view of the cell. A large city being a large database, a small city producing a small database. The algorithm is to find the smallest number of hops using the least amount of power (some level of latency is completely acceptable). Going one step further, there are probably 10 sites that can reach everyone in the cell (derived through an embedded algorithm) that can easily multicast anything. So for the Party-Line(tm) paradigm of a Ham repeater, it could be duplicated at 1/100th the power.

Steve

134. Re: CWID, Pwr rulemaking

From: morganb@inetport.com (Robert B. Morgan)
Date: Sat, 15 Mar 1997 14:38:45 -0600 (CST)
To: ss@tapr.org
Message-ID: <199703152038.0AA25936@admin.inetport.com>
Rendered body type: text/plain

>At 10:55 PM 3/14/97 -0600, Richard Green wrote:
>
>> It can be done... I seem to remember an article many years ago in the
>>AMRAD journal, back when they were experimenting with FHSS, about an SS
>>hidden transmitter hunt they held in the D.C. area. The local FCC field
>>office sent some of their field engineers to join in the fun, and they won
>>it hands down! So much for the amateurs 'leading the technology'. The
>>FCC boys had no trouble finding the hop codes and sync'ing clocks, even
>>though they started the chase with less information about the target than
>>the club members had been given!
>>
>>Richard Green
>>Ann Arbor, MI
>>
>
>Hiya Rick!
>
>You can find references to these tests in the ARRL spread spectrum
>compendium. Look on pages 7-6, 8-8 and 8-26. One of the complaints
>the FCC agents had was they would have taken less than 25 minutes
>to find them if traffic had not been so heavy!
>
>One might want to mention these tests in filings on the NPRM in
>objection to the CWID.
>
>-Jeff

That's an outstanding example of what can be done with SS. My original example of locating a Freewave in the back yard, was of course done with a narrowband receiver, not any kind of programmable FH gear. (And this very comparison graphically shows again how unobtrusive SS can be made to work, unless you are equipped to receive it, you don't). Sort of makes your mouth water, if you had the programmable chipsets, and the programming, and the hop selection choices on the fly, or probably automated investigation of what was being transmitted by all the SS flying through the air. Once you have that, then of course you can create the actual geographical map of where they all are. What more does one need?

Try that with a CW id. That is a LOT less locatable, although it works. (Recall the comparison of a modulated radio wave to a marked yardstick, with the high rates we are looking at with SS, distance measurement gets pretty good indeed. Using a CW ID to identify and presumably track down a station with a datarate that low won't get you much, and to do a good job of ranging it would take lots more work.)

I don't have anything against CW, but this isn't an application for it. This thing is just a paradigm out of place. Maybe it is left over from some of the commercial repeater/pager ID stuff, or what I don't know, but it is narrowband technology, and it is at odds within wideband technology. Mixing the two doesn't do anything except add to a mess.

I guess maybe someone needs to demo it for the record, while we have a little time under the STA, or in the comments/reply of the rulemaking?

73 de Bob WB5A0H
Robert Morgan
Austin Texas
morganb@admin.inetport.com

135. Re: [SS:1186] Designing Repeaters in SS

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Sat, 15 Mar 1997 16:40:07 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970315214007.00377458@mindspring.com>
Rendered body type: text/plain

At 09:14 AM 3/15/97 -0600, in [SS:1186] Steve <n5owk@n5owk.ampr.org> wrote an interesting ops concept for a SS system.

I believe we can hypothesize all sorts of very nice operational concepts

with really big benefits. However, keep in mind that the early implementation will have to rely on existing silicon. That's why I used the simple cordless phone derived example.

I believe we would be lucky if the US amateur radio service represented enough of a market that someone would develop new silicon just to build devices to meet our rules and operational concepts.

Therefore I believe that we must have rules that allow us to use silicon developed for existing commercial SS applications such as cordless phones, part 15.247 WLANS and perhaps the new National Unlicensed Information Infrastructure (I hope I got that acronym right), because anything else is too complex to economically develop and market.

I think the only way we could get a unique ham product would be if all countries adopted identical rules. Perhaps then a Kenwood, ICOM, or Yaesu would build something using custom silicon. I don't think that will happen soon.

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
<http://www.mindspring.com/~lfry/part15.htm>

136. Re: [SS:1188] Re: Designing Repeaters in SS

From: darnell@binmedia.com (Darnell Gadberry)
Date: Sat, 15 Mar 97 16:22:11 -0800
To: <ss@tapr.org>
Message-ID: <19970316001508106.AAA94@[206.117.173.2]>
Rendered body type: text/plain

On 3/15/97, Lee W. Fry AA0JP wrote:

>
>At 09:14 AM 3/15/97 -0600, in [SS:1186] Steve <n5owk@n5owk.ampr.org> wrote
>an interesting ops concept for a SS system.
>
>I believe we can hypothesize all sorts of very nice operational concepts
>with really big benefits. However, keep in mind that the early
>implementation will have to rely on existing silicon. That's why I used the
>simple cordless phone derived example.
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>enough of a market that someone would develop new silicon just to build
>devices to meet our rules and operational concepts.
>
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>developed for existing commercial SS applications such as cordless phones,
>part 15.247 WLANS and perhaps the new National Unlicensed Information
>Infrastructure (I hope I got that acronym right), because anything else is
>too complex to economically develop and market.
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>I think the only way we could get a unique ham product would be if all
>countries adopted identical rules. Perhaps then a Kenwood, ICOM, or Yaesu
>would build something using custom silicon. I don't think that will happen
>soon.
>
>
>Lee W. Fry AA0JP
>lfry@mindspring.com
>See my Part 15 Spread Spectrum Device Compendium at:
><http://www.mindspring.com/~lfry/part15.htm>
>

Lee,

My engineering company (3 individuals) has built custom silicon for customer projects using our own money. With the current generation of development tools it is not rocket science, nor does it require a NASA sized budget to create VERY complex VLSI designs.

Take a look at the MOSIS service homepage : <http://www.mosis.org>.

MOSIS is a US Government supported, University operated (USC), IC fabrication service. They will fabricate silicon for anyone. Starting at \$680 per run for packaged devices. Once you have created a successful design using the MOSIS service, you can take your CIF (A standard IC design interchange format) file to any of several dozen IC foundries who

would be happy to make chips for you. Some of them would even make as few as 50 devices.

I think it is important for us not to limit our options because of perceived barriers.

Just a thought...

- darnell gadberry ke6uc1
binaryMedia Communications
darnell@binmedia.com

137. Wireless Ethernet comments

From: Matt Ettus <mne@cmu.edu>
Date: Sun, 16 Mar 1997 13:15:02 -0500
To: ss@tapr.org
Message-ID: <1.5.4.32.19970316181502.0069d834@gauss.ece.cmu.edu>
Rendered body type: text/plain

A lot of people have been talking about using wireless ethernet DS modems. Also, people have commented on them not using power control, so why should we.

DS Wireless ethernet is NOT CDMA, it is only DSSS. This means that every unit uses the same spreading sequence. Only one unit may transmit at a time, thus no need for power control, unless you have adjacent cells.

DS SS is wasteful of spectrum if one does not use CDMA. Wireless ethernet uses a 11 chip spreading code, thus wasting 11 times the bandwidth necessary. If CDMA was used, more users could transmit at the same time, and the would be no waste.

I think it is pointless to base anything on wireless ethernet, as it is wasteful, old technology, and not standardized. If we truly want to use spread spectrum properly, that implies we use CDMA as well, and that implies we do something custom.

Matt
N2MJI

138. Another Power Control 97.311 as proposed

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Sun, 16 Mar 1997 16:50:38 -0600
To: " Spread Spectrum "<ss@tapr.org>
Message-ID: <v03020773af522714f0de@[208.134.134.40]>
Rendered body type: text/plain

If the proposed rules say this:

97.311 SS emission types.

(a) SS emission transmissions by an amateur station are authorized only for communications between points within areas where the amateur service is regulated by the FCC and between an area where the amateur service is regulated by the FCC and an amateur station in another country that permits such communications. SS emission transmissions must not be used for the purpose of obscuring the meaning of any communication.

(b) A station transmitting SS emissions must not cause harmful interference to stations employing other authorized emissions, and must accept all interference caused by stations employing other authorized emissions.

(c) Reserved.

(d) Reserved.

(e) *****

(f) *****

(g) The transmitter power must not exceed 100 W under any circumstances. If more than 1 W is used, automatic transmitter control shall limit output power to that which is required for the communication. This shall be determined by the use of the ratio, measured at the receiver, of the received energy per user data bit (Eb) to the sum of the received power spectral densities of noise (N0) and co-channel interference (I0). Average transmitter power over 1 W shall be automatically adjusted to maintain an Eb/ (N0 + I0) ratio of no more than 23 dB at the intended receiver .

which 97.311(b) is the key, and we include the existing rules about using minimum power for communications, do we need the power control rules 97.311(g) on top of all that as well ?

This says that we probably need to stay away from the lower parts of the bands (i.e. bandplanning) where weak signal work is happening -- unless we can show a designed system doesn't interfere with these operations.

If the people who follow the rules follow 97.311(b) and the other rules which are already on the book, is there anything stopping us from asking for 50Mhz and above because we can't interfere with people if we follow the rules (like we are suppose to in the spirit of amateur radio). Isn't 97.311(g) redundant in scope ?

Maybe I am missing something here ?

Just thinking (or in this case writing) out loud.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

139. NPRM...

From: Tony McConnell <n3jly@erols.com>
Date: Mon, 17 Mar 1997 01:07:25 -0500 (EST)
To: ss@tapr.org
Message-ID: <199703170607.BAA28031@smtp2.erols.com>
Rendered body type: text/plain

in a way doesn't this statement of power controll assume that the path or conditions is known?

are they saying we can only use this for point to point work? and meet that criteria?

let's include in each of our transmissions a recipient in East BF Egypt, and when he can tell us to QRP, we will.

This is one man opinion, I could be wrong. N3JLI

140. Re: [SS:1191] Another Power Control 97.311 as proposed

From: wb9mjn@wb9mjn.ampr.org
Date: Mon, 17 Mar 97 08:33:47 UTC
To: ss@tapr.org
Message-ID: <13240@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Greg,

Yes, that's right, in a closed loop situation. When both stations know of each other's presence, no problem. Just follow the non-interference rules.

Power control makes sense in the open loop situation. When one or more stations are unaware of the other's presence, or specific circumstance. One cannot know who is listening to what when, and where from, all the time, of course.

The 1 watt limit still gives us advantage over Part 15, which have a 4 watt ERP limitation. So, there really is no worry about being competitive with Part 15, with the power limitations.

NB ID'ing is the BIG issue, I think. It necessitates a backward looking, and unfair (nobody else has to id in a mode other than they operate on), and interference generating (the narrowband ID may be more interference than the SS signal itself!) practice. And as others have pointed out, the FCC can track down any SS signal, no problem. So, have the supposed reason for it, is un-

founded. Make that "half the supposed reason".

141. narrow band id...

From: Tony McConnell <n3jly@erols.com>
Date: Mon, 17 Mar 1997 21:41:56 -0500
To: ss@tapr.org
Message-ID: <199703180241.VAA21016@smtp3.erols.com>
Rendered body type: text/plain

yes this requirement is a pain.

how about sending a 9600 binary phase shift keyed ax.25 packet. it can't take that long.

142. Re: [SS:1194] narrow band id...

From: Dirk Koopman <djk@tobit.co.uk>
Date: Tue, 18 Mar 1997 10:20:28 +0000 (GMT)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970318100217.227100-100000@dirku.tobit.co.uk>
Rendered body type: text/plain

On Mon, 17 Mar 1997, Tony McConnell wrote:

> yes this requirement is a pain.
>

Here in the UK, I am struggling a bit to see if our equiv of the FCC (the RA) will licence SS. One of the problems that I face is the ID; how and what should it be. Unlike the US, ax25 packet here has to CW ID every 30 minutes so it is more difficult to escape.

Unfortunately it is also difficult to justify an argument along the lines of "well it is just too hard", as a CW keyer isn't a very complex device! Just because it means adding a little bit of extra logic to a nice commercial chipset that one has slung together probably will cut no ice with anyone.

One thing you could argue is that you would not really require much power. In fact it is likely that you would only be causing any noticeable interference in the near field (which is where an SS signal is most easily detected) and therefore you need only ID in such a way as to be easily detectable there (or a little bit beyond). 1/2mW every 30 minutes? Less?

One of the other things concerning the RA is how does one publish or otherwise acquire the spreading codes and modes of people communicating in a band; in other words how does one "join in" with an existing "conversation". I currently see no satisfactory way of doing this.

One of the possible uses of ID is to promulgate things like "my PN sequence, mode" etc, but this then means higher power for longer.

Dirk

--

Dirk-Jan Koopman Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant Email: djc@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than the piano when played by a sister or near relation." --Oscar Wilde

143. Single Guassian Pulses

From: Dirk Koopman <djk@tobit.co.uk>
Date: Tue, 18 Mar 1997 13:42:52 +0000 (GMT)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970318133156.22710P-100000@dirku.tobit.co.uk>
Rendered body type: text/plain

Some time ago I read an article on web about "single guassian pulses", I no longer have the URL, but I believe it came from this sig.

It appears that it is legal in the UK to use 'pulse' modulation, nobody that I know does (or has ever, in the recent past), but could this be an interesting mode to work on?

It does seem to be a fairly extreme form of SS after all, if it is single and gaussian, a pulse has infinite bandwidth (if I remember my theory correctly).

The article described roughly what was going in that it had a GPS

synchronised correlating detector on a direct modulation receiver. It essentially sampled a short time before and after a reference time to determine 0 or 1. It also seems to produce very reasonable ranges for not much power (>10Km for a few milliwatts).

Not being a hardware man, but having a fair amount of software experience with GPS, xntp etc, it strikes me that, if you want something simple to construct, this might be a better way forward than looking at either DS or FH + I suspect it is already licenced.

Any views?

--

Dirk-Jan Koopman Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant Email: djktobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than the piano when played by a sister or near relation." --Oscar Wilde

144. Re: [SS:1196] Single Guassian Pulses

From: hbaker@netcom.com (Henry G. Baker)
Date: Tue, 18 Mar 1997 08:22:49 -0800 (PST)
To: ss@tapr.org
Cc: hbaker@netcom.com, djktobit.co.uk
Message-ID: <199703181622.IAA17793@netcom16.netcom.com>
Rendered body type: text/plain

> Some time ago I read an article on web about "single gaussian pulses", I
> no longer have the URL, but I believe it came from this sig.
>
> It appears that it is legal in the UK to use 'pulse' modulation, nobody
> that I know does (or has ever, in the recent past), but could this be an
> interesting mode to work on?
>
> It does seem to be a fairly extreme form of SS after all, if it is single
> and gaussian, a pulse has infinite bandwidth (if I remember my theory
> correctly).

You may be referring to Pulson's 'time-hopping' impulse modulation system.
Yes, it is wide-band, and yes, it does work -- I've seen their lab in
Huntsville, Alabama.

I've had trouble posting to the ss mailing list, so perhaps you can
do it for me?

The URL is <http://206.161.232.178/pulson/>

--

Henry Baker
www/ftp directory URL:
<ftp://ftp.netcom.com/pub/hb/hbaker/home.html>

145. Re: [SS:1197] Re: Single Guassian Pulses

From: Dirk Koopman <djktobit.co.uk>
Date: Tue, 18 Mar 1997 17:39:57 +0000 (GMT)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970318173213.227105-100000@dirku.tobit.co.uk>
Rendered body type: text/plain

On Tue, 18 Mar 1997, Henry G. Baker wrote:

> > Some time ago I read an article on web about "single gaussian pulses", I
> > no longer have the URL, but I believe it came from this sig.
> >
> > It appears that it is legal in the UK to use 'pulse' modulation, nobody
> > that I know does (or has ever, in the recent past), but could this be an
> > interesting mode to work on?
> >
> > It does seem to be a fairly extreme form of SS after all, if it is single
> > and gaussian, a pulse has infinite bandwidth (if I remember my theory
> > correctly).
> >
> > You may be referring to Pulson's 'time-hopping' impulse modulation system.
> > Yes, it is wide-band, and yes, it does work -- I've seen their lab in
> > Huntsville, Alabama.
> >

Yes, that's the one. Now according to my licence I can output up to
400watts of pulse position modulated pulses. That should cause a small
stir in the EME segment...

When I started there used to be p.r.f which now doesn't seem to apply (mind you, if I remember correctly I could use 25Kw peak power, but that is going back a loooooong way).

I would be happy with few mW, pulson seems to imply this would be undetectable out of the very small near field. It looks a comparatively simply scheme, is it worth looking at?

Dirk

--

Dirk-Jan Koopman Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant Email: djktobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than the piano when played by a sister or near relation." --Oscar Wilde

146. Re: [SS:1198] Re: Single Guassian Pulses

From: hbaker@netcom.com (Henry G. Baker)
Date: Tue, 18 Mar 1997 12:40:09 -0800 (PST)
To: ss@tapr.org
Cc: hbaker@netcom.com, djktobit.co.uk
Message-ID: <199703182040.MAA00357@netcom6.netcom.com>
Rendered body type: text/plain

> I would be happy with few mW, pulson seems to imply this would be
> undetectable out of the very small near field. It looks a comparatively
> simply scheme, is it worth looking at?

Yes. The system I saw is invisible to nearly all types of test equipment more than a few meters away. The pulses have to have picosecond accuracy, tho, which requires an order of magnitude better timing accuracy than is readily available.

--

Henry Baker
www/ftp directory URL:
ftp://ftp.netcom.com/pub/hb/hbaker/home.html

147. Re: Progress on Clover (fwd)

From: George Cserenyi <zsolt@direct.ca>
Date: Tue, 18 Mar 1997 16:59:44 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970318165334.16426A-100000@cirnos.ci.ca>
Rendered body type: text/plain

Hi,

I'd like to submit this message to the ss group
for further clarification and comments.

George
ve7Ciz

----- Forwarded message -----

Date: Tue, 18 Mar 1997 13:59:57 -0600
From: Greg Blakely <webmaster@mnwg.ncr.cap.gov>
To: George Cserenyi <zsolt@direct.ca>
Cc: tnos-topics@lantz.com, cap-ndrn@cap.af.mil
Subject: Re: Progress on Clover

Greg Blakely <webmaster@mnwg.ncr.cap.gov> wrote:

>

> 3. Someone at CAP national said that they had heard that HAL had come up
> with a new "Spread-Spectrum" card that would be quite a bit faster than
> the existing one, and that the code was almost identical to the old
> stuff,
> just an added command or two.

>

George Cserenyi wrote:

>

>> Does clover use "Spread-Spectrum", or how is this related to
>> the subject : Re: Progress on Clover ?
>>

I'm not sure that "Spread Spectrum" is EXACTLY the right word to use, but what it amounts to is that, currently, Clover uses a number of subchannels (either 6 or 8, I believe) when tuned to a certain frequency. The signal is varied in pitch on all those sub-channels, using up a certain bandwidth. 1.5 kHz, I think...

They are planning to go to a new concept of using the whole bandwidth for one "super-channel", thereby improving the throughput.

Not having talked directly with HAL about this, I am not sure exactly how many subchannels they have now, nor exactly what the bandwidth is, but you get the idea.

>

> Who is "CAP national" BTW?

>

Good question. And I shouldn't use abbreviations when I know I'm dealing in relative obscurities. CAP stands for Civil Air Patrol, who, along with MARS, uses Clover technology and AX25 packet to keep their Nationwide Packet system tied together.

What has happened at CAP is that traffic has fallen off drastically on packet, since everyone now seems to have Internet addresses. But, being an Emergency-Services organization, there is a reluctance to rely too heavily on the Publicly Switched Telephone Network. TNOS provides a great opportunity to meld Internet and Packet, and still provide a survivability should parts of the PSTN go down.

-Greg-

kb0tdf@kb0tdf.ampr.org

mn0045@mn0045.mnwg.ncr.cap.gov

148. Re: [SS:1200] Re: Progress on Clover (fwd)

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>

Date: Tue, 18 Mar 1997 18:11:09 -0600

To: ss@tapr.org

Message-ID: <v03020707af54df60c3e0@[208.134.134.40]>

Rendered body type: text/plain

The real experts on what HAL is doing are over on the HF SIG. Might want to ask over there as well.

Figure in several years DSP, HF, and SS SIGs will all be doing the same things.

Cheers - Greg

>Hi,

> I'd like to submit this message to the ss group

>for further clarification and comments.

>George

>ve7ciz

>

>----- Forwarded message -----

>Date: Tue, 18 Mar 1997 13:59:57 -0600

>From: Greg Blakely <webmaster@mnwg.ncr.cap.gov>

>To: George Cserenyi <zolt@direct.ca>

>Cc: tnos-topics@lantz.com, cap-ndrn@cap.af.mil

>Subject: Re: Progress on Clover

>

>Greg Blakely <webmaster@mnwg.ncr.cap.gov> wrote:

>>

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>> with a new "Spread-Spectrum" card that would be quite a bit faster than

>> the existing one, and that the code was almost identical to the old

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>>> They are planning to go to a new concept of using the whole bandwidth

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>>>

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>>> how many subchannels they have now, nor exactly what the bandwidth is,

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>along with MARS, uses Clover technology and AX25 packet to keep their
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>great opportunity to meld Internet and Packet, and still provide a
>survivability should parts of the PSTN go down.
>
>-Greg-
>kb0tdf@kb0tdf.ampr.org
>mn0045@mn0045.mnwg.ncr.cap.gov

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd

149. Re: [SS:1201] SS digest 271

From: DENIS BRZAN <denis.brzan@guest.arnes.si>
Date: Thu, 20 Mar 1997 01:14:10 +0100
To: ss <ss@tapr.org>
Message-ID: <199703200008.AAA11357@razor.arnes.si>
Rendered body type: text/plain

Spet nekaj pošte
od S57NBD 73!!

> From: ss@tapr.org
> To: ss@tapr.org
> Subject: [SS:1201] SS digest 271
> Date: 19. marec 1997 23:50
>
> SS Digest 271
>
> Topics covered in this issue include:
>
> 1) Re: Progress on Clover (fwd)
> by George Cserenyi <zsolt@direct.ca>
> 2) Re: Progress on Clover (fwd)
> by "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
>
> -----
>
> Date: Tue, 18 Mar 1997 16:59:44 -0800 (PST)
> From: George Cserenyi <zsolt@direct.ca>
> To: ss@tapr.org
> Subject: Re: Progress on Clover (fwd)
> Message-ID: <Pine.LNX.3.95.970318165334.16426A-100000@cirmos.ci.ca>
>
> Hi,
> I'd like to submit this message to the ss group
> for further clarification and comments.
> George
> ve7ciz
>
> ----- Forwarded message -----
> Date: Tue, 18 Mar 1997 13:59:57 -0600
> From: Greg Blakely <webmaster@mnwg.ncr.cap.gov>
> To: George Cserenyi <zsolt@direct.ca>
> Cc: tnos-topics@lantz.com, cap-ndrn@cap.af.mil
> Subject: Re: Progress on Clover
>
> Greg Blakely <webmaster@mnwg.ncr.cap.gov> wrote:
> >
> > 3. Someone at CAP national said that they had heard that HAL had come
> up
> > with a new "Spread-Spectrum" card that would be quite a bit faster than
>
> > the existing one, and that the code was almost identical to the old
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> > just an added command or two.

> >
> George Cserenyi wrote:
> >
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> heavily on the Publicly Switched Telephone Network. TNOS provides a
> great opportunity to meld Internet and Packet, and still provide a
> survivability should parts of the PSTN go down.
>
> -Greg-
> kb0tdf@kb0tdf.ampr.org
> mn0045@mn0045.mnwg.ncr.cap.gov
>
> -----
>
> Date: Tue, 18 Mar 1997 18:11:09 -0600
> From: "Greg Jones, WDSIVD" <wd5ivd@tapr.org>
> To: ss@tapr.org
> Subject: Re: Progress on Clover (fwd)
> Message-ID: <v03020707af54df60c3e0@[208.134.134.40]>
>
> The real experts on what HAL is doing are over on the HF SIG. Might want
> to ask over there as well.
>
> Figure in several years DSP, HF, and SS SIGs will all be doing the
> same
> things.
>
> Cheers - Greg
>
> >Hi,
> > I'd like to submit this message to the ss group
> >for further clarification and comments.
> >George
> >ve7ciz
> >
> >----- Forwarded message -----
> >Date: Tue, 18 Mar 1997 13:59:57 -0600
> >From: Greg Blakely <webmaster@mnwg.ncr.cap.gov>
> >To: George Cserenyi <zsoltdirect.ca>
> >Cc: tnos-topics@lantz.com, cap-ndrn@cap.af.mil
> >Subject: Re: Progress on Clover
> >
> >Greg Blakely <webmaster@mnwg.ncr.cap.gov> wrote:
> >>
> >> 3. Someone at CAP national said that they had heard that HAL had come
> up
> >> with a new "Spread-Spectrum" card that would be quite a bit faster
> than
> >> the existing one, and that the code was almost identical to the old
> >> stuff,
> >> just an added command or two.
> >>
> >George Cserenyi wrote:

```

> >>
> >>> Does clover use "Spread-Spectrum", or how is this related to
> >>> the subject : Re: Progress on Clover ?
> >>>
> >I'm not sure that "Spread Spectrum" is EXACTLY the right word to use,
> >but what it amounts to is that, currently, Clover uses a number of
> >subchannels (either 6 or 8, I believe) when tuned to a certain
> >frequency. The signal is varied in pitch on all those sub-channels,
> >using up a certain bandwidth. 1.5 kHz, I think...
> >
> >They are planning to go to a new concept of using the whole bandwidth
> >for one "super-channel", thereby improving the throughput.
> >
> >Not having talked directly with HAL about this, I am not sure exactly
> >how many subchannels they have now, nor exactly what the bandwidth is,
> >but you get the idea.
> >>
> >> Who is "CAP national" BTW?
> >>
> >Good question. And I shouldn't use abbreviations when I know I'm
> >dealing in relative obscurities. CAP stands for Civil Air Patrol, who,
> >along with MARS, uses Clover technology and AX25 packet to keep their
> >Nationwide Packet system tied together.
> >
> >What has happened at CAP is that traffic has fallen off drastically on
> >packet, since everyone now seems to have Internet addresses. But, being
> >an Emergency-Services organization, there is a reluctance to rely too
> >heavily on the Publicly Switched Telephone Network. TNOS provides a
> >great opportunity to meld Internet and Packet, and still provide a
> >survivability should parts of the PSTN go down.
> >
> >-Greg-
> >kb0tdf@kb0tdf.ampr.org
> >mn0045@mn0045.mnwg.ncr.cap.gov
> >
> >
> >-----
> >Greg Jones, WD5IVD
> >Austin, Texas
> >wd5ivd@tapr.org
> >http://www.tapr.org/~wd5ivd
> >-----
> >
> >
> >-----
> >
> >End of SS Digest 271
> >*****

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150. [SS:816] Unlicensed National Information Infrastructure

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From: "thomas w. barefoot" <barefeet@ns.awanet.com>
Date: Thu, 20 Mar 1997 08:03:16 -0500
To: ss@tapr.org
Message-ID: <1.5.4.16.19970320130316.2d5fc044@ns.awanet.com>
Rendered body type: text/plain

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By Report and Order FCC 97-005 January 9, 1997 the FCC has created a home for the NII. See <http://www.fcc.gov/oet/headline/et96-102/> for details.

Quoting some selected paragraphs from 97-005:

"By this action, we amend Part 15 of our rules to make available 300 megahertz of spectrum at 5.15-5.35 GHz and 5.725-5.825 GHz for use by a new category of unlicensed equipment, called Unlicensed National Information Infrastructure ("U-NII") devices."

"The Commission has determined that the public interest is best serviced by increasing the maximum peak power limit as follows: 50 mW peak transmitter output power with up to 6 dBi antenna gain (equates to 200 mW EIRP) permitted in the 5.15-5.25 GHz band; 250 mW peak transmitter output power with up to 6 dBi antenna gain (equates to 1 W EIRP) permitted in the 5.25-5.35 GHz band; and 1 W peak transmitter output power with up to 6 dBi antenna gain (equates to 4 W EIRP) permitted in the 5.725-5.825 GHz band. In addition, to permit manufacturers flexibility in designing U-NII equipment, the Commission will permit the use of higher directional antenna gain provided there is a corresponding reduction in transmitter output power of one dB for every dB that the directional antenna gain exceeds 6 dBi. Also, U-NII use of the 5.15-5.25 GHz band is restricted to indoor operations

only. Further, this action adopts a power spectral density ("PSD") requirement for U-NII devices that would require that the maximum power be spread across of bandwidth of at least 20 megahertz. This PSD requirement will ensure that U-NII devices spread its signal energy evenly across the band and encourages the use of this spectrum by wideband high data rate applications, but permits non-wideband operations at reduced powers. These increased power limits will permit U-NII equipment manufacturers, many of which may be small businesses, more flexibility to develop products to meet market demands."

"The Commission has now concluded that the proposed LBT spectrum etiquette could delay deployment of U-NII devices and hinder innovation in the development of these devices. Rather, the Commission has concluded that simple technical rules, such as PSD limits and out-of-band emission requirements, should be sufficient to ensure spectrum sharing between incumbent operations and new U-NII devices. The Commission declined to adopt a spectrum etiquette, any channelization plan, or a minimum modulation efficiency requirement because such requirements may preclude certain technologies or some of the many different concepts envisioned by U-NII proponents. We believe this action will benefit small entities by permitting these entities to develop innovative equipment to meet market demands without having to follow protocols governing use of the spectrum. "

Lee W. Fry
lfry@wdl.lmco.com

151. [SS:974] Re: SS:938 & SS:960

From: "thomas w. barefoot" <barefeet@ns.awanet.com>
Date: Thu, 20 Mar 1997 08:03:20 -0500
To: ss@tapr.org
Message-ID: <1.5.4.16.19970320130320.3e7f3454@ns.awanet.com>
Rendered body type: text/plain

Here's a little more ACTION for the SS adventuresome out there in TAPR-land:

I have posted schematics, PCB files & basic 16C64 microprocessor code up on my site for some of the SST-1 radio-modem -- for your viewing and downloading pleasure!

Take a look at: <http://sss-mag.com/whatsnew/nuissue.html#3>

A BARE PCB for the "Baseband" section of the SST-1 will be available soon at US\$39 each -- see above link for more info.

BTW, this project was originally dubbed the "VAPOR1" as a play on words -- it has now become the SST-1, but some of the files still have vapor'ish names :-)

73 for now,

Randy, KC6YJY

152. [SS:1043] Wide Band Gain Antenna...

From: "thomas w. barefoot" <barefeet@ns.awanet.com>
Date: Thu, 20 Mar 1997 08:04:36 -0500
To: ss@tapr.org
Message-ID: <1.5.4.16.19970320130436.3e7f01a0@ns.awanet.com>
Rendered body type: text/plain

Hi All,

This is related to SS, but not specifically about SS. So, please excuse the variation from the list's primary interest, please, please, hi.

This week I finished up a 1270 Mhz , 8 dBd antenna, which covers the whole 1270 band with 1.6 or better VSWR. Please do not take this as a final spec, but a typical number. The final spec , could be better, but it may be worse.

This antenna fits in 12 by 9 inch enclosure similar to the Ham/LAN Panel 915 antennas.

If we multiply by 3, we end up with 36 by 18. Which would be the size of a 440 whole band antenna, with 2:1 or better VSWR. Yep, the whole band, with 8dBd! 420 to 450 Mhz. This is significantly better than colinear antenna bandwidths. Its is similar to multiple bay full wave loop antennas, but with out the reliability problems of corporate coaxial feeds.

Now, how does this effect SS? Welp, yagis, and colinears are the type of antennas used at user stations. A multiple bay full wave loop antenna, is a bit of a large expense. Additionally, this prototype can be operated in horizontal polarisation, with a azimuthal beamwidth of the order of 70 degrees. Multiple bay full wave loop antennas, can have the loops turned horizontal, but they lose the reflection off the mast. Thus requiring modification to add a reflector mast boom at each point of the mast where there is an element.

Horizontal, good F/B ratio, and gain, might be away to do SS on 440. It would attenuate most of the FM. And the F/B ratio could be put to good use keeping TV transmitters out of receivers. With the whole band for spreading, it would also keep the processing gain maximised, resulting in a minimum interference to other modes.

And, of course, on 1270, this antenna fills a gap. A small gain antenna, for SS users, covering the whole band. Most yagi s in this band have trouble covering the whole band. F9FT sells yagi s for the high side, and low side separately. 60 Mhz, spread 56 KB is 28 dB processing gain.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn@wb9mjn.ampr.org@uugate.aim.utah.edu

153. [SS:1057] Ground-Up Spread Spectrum

From: "thomas w. barefoot" <barefeet@ns.awanet.com>
Date: Thu, 20 Mar 1997 08:04:39 -0500
To: ss@tapr.org
Message-ID: <1.5.4.16.19970320130439.3e7fb722@ns.awanet.com>
Rendered body type: text/plain

On the subject of designing our own SS system

I think that designing our own is the only way to go. Relying on eval boards or cutting apart other designs is expensive and destined to be reliant on their technology.

This past summer, I designed a 900MHz SS modem for a commercial application. It could be built on a 5x7 PCB, and was not layout critical except for the RF section. Total cost was about \$100 in production (~1000) quantity. There is no reason we couldn't do something similar with all of the RF ICs and SS ICs currently available.

I would suggest that anyone interested look at the Cylink home page (I think its www.cylink.com, but check Yahoo). They make about 6 different chips for doing DS SS at bit rates of 1200 to 2Mbit/s, with chip rates up to 32 per bit. The chips also start for very low prices (\$12 for the slow ones), and handle most of the SS stuff. They can be programmed by a simple microcontroller (we used a 68HC05).

73
Matt Ettus
N2MJI

154. [SS:1058] News on SS NPRM

From: "thomas w. barefoot" <barefeet@ns.awanet.com>
Date: Thu, 20 Mar 1997 08:04:40 -0500
To: ss@tapr.org
Message-ID: <1.5.4.16.19970320130440.3e7f7272@ns.awanet.com>
Rendered body type: text/plain

The FCC released the long awaited NPRM on "Amendment of the Amateur Service Rules to Provide For Greater Use of Spread Spectrum Communication Technologies", FCC 97-10 yesterday.

If the FCC doesn't post the NPRM up on their website in the next several days, then TAPR will see that its posted on our website. The last time I checked this morning, it still wasn't available from the FCC website.

If you're interested in just what the rule changes the FCC is proposing to Part 97 for spread spectrum, they are word for word the same language that the ARRL proposed in their petition, RM-8737 (available on the TAPR website). Comments are due on May 5, 1997 and reply comments are due June 5, 1997.

-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com  
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM  
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>  
Fax: (510) 770-9854 !  
~~~~~

155. [SS:1059] Re: SS Design

From: "thomas w. barefoot" <barefeet@ns.awanet.com>
Date: Thu, 20 Mar 1997 08:04:40 -0500
To: ss@tapr.org
Message-ID: <1.5.4.16.19970320130440.3e7fa4dc@ns.awanet.com>
Rendered body type: text/plain

Hi Paul,

I have some comments on ur lineup. What u have proposed is somewhat expensive.

If the data i/o and control i/o were done virtually over a Ethernet port, the hardware costs would be allot less there, and the programing would be about the same, hopefully.

I would not use a Transverter. They are very expensive. The SS box should do analog I/Q to a "Data Radio". Optional parallel and/or one wire serial I/Q would be nice too. Some Data Radio line ups want one wire data, and internally they split it out into parallel, before aplying it to a D/A. SO, maybe a better solution would be analog/one wire digital I/Q, switch selectable, with an optional external parrallel Data I/Q converter.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

156. [SS:1066] FCC Releases WT Docket 97-12

From: "thomas w. barefoot" <barefeet@ns.awanet.com>
Date: Thu, 20 Mar 1997 08:04:43 -0500
To: ss@tapr.org
Message-ID: <1.5.4.16.19970320130443.3e7f986e@ns.awanet.com>
Rendered body type: text/plain

<http://www.tapr.org/ss>
and
<ftp://ftp.tapr.org/tapr/ss>

now contains a pdf version of FCC WT Docket No. 97-12.

WT Docket No. 97-12 Notice of Proposed Rule Making regarding Amendment of the Amateur Service Rules to Provide For Greater Use of Spread Spectrum Communications Technologies was released March 3rd, 1997.

3/5/97

157. [SS:1147] Re: WT Docket No. 97-12 - Hollow Victory?

From: "thomas w. barefoot" <barefeet@ns.awanet.com>
Date: Thu, 20 Mar 1997 08:04:46 -0500
To: ss@tapr.org
Message-ID: <1.5.4.16.19970320130446.3e7f9620@ns.awanet.com>
Rendered body type: text/plain

Jeff King wrote:

>

> At 09:33 PM 3/11/97 -0600, Dewayne Hendricks wrote:

> > Metricom implements and uses auto power control in both their pole

> > top and end-user devices.

> >

> Thanks Dewayne, I wasn't sure about this. Its interesting to note that

> they are not required to do this under Part 15, but chose to.

It's not a technical or do-gooder thing, it's an investment. Marketing says they want to sell xxxx accounts, engineering responds with a way to do this, + a little slop. If they used no power control: marketing would fail, the stock would fail, and investors would go away.

Big business doesn't plan anything for the short term.

They also would not tolerate a bunch of choo-choo era morse code ID's every 10 minutes in the middle of their fricking channel :-)

Steve
"reading my marketing 101 notes"

158. Steve Bible, N7HPR, on Ham Radio and More

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Thu, 20 Mar 1997 10:00:50 -0600
To: "TAPR-BB list mailing" <tapr-bb@tapr.org>,
"Spread Spectrum" <ss@tapr.org>, "TAPR Board" <tapr-board@tapr.org>
Message-ID: <v0302073caf570daf17ae@208.134.134.40>
Rendered body type: text/plain

TAPR's very own Steve Bible, N7HPR, will be a guest on Len Winkler's Ham Radio & More Show Sunday March 30th at 2300 UTC. The topic will be the New SPREAD SPECTRUM Plan.

Ham Radio & More Show information:

<http://www.goodnet.com/~lenwink/hrm.htm>

To listen to past Ham Radio & More Shows via Real Audio (Sponsored by TAPR):

<http://www.tapr.org/hrm>

The Ham Radio & More Show airs LIVE each Sunday at 6:00pm ET, (2300 utc), on:

- many local commercial stations throughout the country,
(See <http://www.goodnet.com/~lenwink/affil-1.htm> for listing)
- WWCN Shortwave, 5.070 MHz, and
- RealAudio at: <http://www.AudioNet.com/radio/business/kbnp>
(Thanks KBNP)

Also available tape delayed via WWCN Shortwave on Mondays, at 1000 utc on 3.210 MHz, and Sundays at 0600 utc on 5.070 MHz.

Tucson Amateur Packet Radio
8987-309 E Tanque Verde Rd #337 * Tucson, Az * 85749-9399 * 817-383-0000

e-mail: TAPR@TAPR.ORG ftp: ftp.tapr.org web: <<http://www.tapr.org/>>

159. 1997 ARRL/TAPR DCC Announcement - forwarded message from Greg Jones

From: Dino Darling <dinod@deltanet.com>
Date: Thu, 20 Mar 1997 15:51:21 -0800
To: tapr-tnc@tapr.org
Cc: netsig@tapr.org, ss@tapr.org
Message-ID: <1.5.4.32.19970320235121.006909ac@mail.deltanet.com>
Rendered body type: text/plain

>
>1997 ARRL and TAPR Digital Communications Conference
>October 10-12, 1997
>Baltimore, Maryland (minutes from BWI airport)
>
>Web: <http://www.tapr.org/dcc>

With respect to TAPR and its members, Maryland is too far! What ever happened to La Vegas? Why not Dayton (not the same time as the Dayton Hamvention!)? Dayton is at least central to the US packet community.

I understand there are many good Digital Operators on the east coast and Maryland will serve them well,

but it is expensive for us on the left coast!

Dino Darling...KC6RIX
TAPR Member #3685 / ARRL Member
dinod@deltanet.com

160. Re: [SS:1212] 1997 ARRL/TAPR DCC Announcement - forwarded message from Greg

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Thu, 20 Mar 1997 18:28:12 -0600
To: ss@tapr.org
Message-ID: <v0302076aaf57868f86da@[208.134.134.40]>
Rendered body type: text/plain

Dino,

as has been stated from the beginning of the joint meeting process between the ARRL and TAPR, the location of the DCC moves from East Coast to West Coast. Texas '95, Washington '96, now Maryland in '97. Next year a site in the central part of the US will be picked, the year after that it will be in the West again, and then back to the East coast.

Thus, someone last year was probably saying this same thing about Washington state who lived on the East coast.

In this fashion, if you don't want to fly -- and BWI is not all the expensive to get in and out of -- then you pass on this year and wait for it to move a little closer until it gets back around to your part of the US. Most of us just budget that it is going to cost money to fly to it no matter where it is and every year the airfare is different anyways -- not dependent on distance.

This is a fair solution to all TAPR and ARRL members alike who want to attend the conference.

Air fare is cheap. I flew from DFW to BWI for \$175 a month ago. Out of all the airports in that part of the US, BWI has some of the best prices for getting in and out of. If you made reservations now -- while the prices are still in flux you might find a pretty low cost ticket...or like many us -- use those advantage miles.

As to Las Vegas. Seattle was the replacement for Las Vegas in 1996. As was reported in the PSR last year, after checking on hotel locations and availability for Las Vegas, ARRL and TAPR couldn't afford to hold the conf there. If we had wanted to hold the conf in the middle of the week, they were all setup to afford what we could meet, but holding the conf on the weekend in Las Vegas was not possible. Meeting space was a full price on the weekends.

If you want it local, the best solution is to become a local co-host.

Cheers - Greg

```
>>
>>1997 ARRL and TAPR Digital Communications Conference
>>October 10-12, 1997
>>Baltimore, Maryland (minutes from BWI airport)
>>
>>Web: http://www.tapr.org/dcc
>
>With respect to TAPR and its members, Maryland is too far! What ever
>happened to La Vegas? Why not Dayton (not the same time as the Dayton
>Hamvention!)? Dayton is at least central to the US packet community.
>
>I understand there are many good Digital Operators on the east coast and
>Maryland will serve them well, but it is expensive for us on the left
>coast!
>
>Dino Darling...KC6RIX
>TAPR Member #3685 / ARRL Member
>dinod@deltanet.com
```

```
-----
Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----
```

161. [FCCREG:587] More on the 5.8 GHz U-NII band matters

From: wd5ivd@tapr.org
Date: Fri, 21 Mar 1997 12:55:31 -0600
To: "TAPR-BB list mailing"<tapr-bb@tapr.org>,
" Spread Spectrum "<ss@tapr.org>
Message-ID: <v0300780aaf5889cf5dae@[208.134.134.40]>
Rendered body type: text/plain

Latest news as of 8AM PST, Mar. 21, 1997, on the 5725-5875 Mhz.
potential reallocation and related matters --

To those of you on the Pacific Division 5725 - 5875 MHz Alert List ---

As you will recall, in January 1997, the FCC issued a Report and Order on Docket 96-102 dealing with the 5.8 GHz Amateur Band and adjacent spectrum. At that time, I sent you a six part message with the details of the Report and Order from the FCC.

Early in March, 1997, three Petitions for Reconsideration on Docket 96-102 were submitted to the FCC. The following is a brief description of the contents of the three petitions obtained from an article in the trade press:

Manufacturers Ask for Changes in Unlicensed 'NII' Device Rules

In petitions for reconsideration filed last week, Apple Computer, Inc., Hewlett-Packard Co., and the Wireless Information Networks Forum, Inc. (WINForum) urged the FCC to modify its recent order in Engineering and Technology docket 96-102 to allow more highly directional antennas and greater power levels for certain unlicensed devices. In its order, the Commission had designated 300 megahertz of spectrum in the 5 gigahertz band for unlicensed NII (national information infrastructure) devices to be used for low-power data communications.

The FCC had divided the U-NII band into three segments: indoor communications, medium-range communications, and somewhat longer-range 'community networks' that would allow wireless connections to Internet service providers. The FCC has not yet authorized any U-NII equipment for sale to the public.

In its petition for reconsideration, Apple asked the Commission to consider permitting the use of more highly directional antennas for U-NII devices. The agency could take up that request when it considers a similar issue for unlicensed spread-spectrum devices in another proceeding (engineering and Technology docket 96-8), Apple suggested.

The "core question of whether the use of more highly directional antennas will increase, or instead reduce, objectionable interference to others sharing the 5725-5850 MHz band can best be addressed if all relevant attributes of both spread-spectrum and U-NII devices are 'on the table' at the same time," it said.

The Commission also should allow the use of directional antennas for the medium-range U-NII band, Apple argued. While the 1-watt power limit for that segment is "adequate to permit the creation of longer-reach community networks," the U-NII rules allow only lower-range omnidirectional antennas in the middle segment. Such a restriction will "frustrate the ability of manufacturers and users seeking to create community networks," Apple said.

It urged the FCC to increase the permissible power density in the upper and middle U-NII segments to permit U-NII links to support data rates at the T-1 level, and even faster, over distances exceeding the "several kilometers" allowed by the Commission's rules.

Hewlett-Packard asked the FCC to raise the permitted power level in the lowest U-NII segment from 200 milliwatts to 1 watt. This would "promote international harmonization" of technical standards for unlicensed 5 GHz devices, permit manufacturers to design products suitable for both U.S. and European markets, and "make possible the development of more robust and longer-range U-NII devices" in this segment, Hewlett-Packard said.

WINForum, a trade association representing manufacturers of unlicensed devices, commended the FCC for making U-NII products available for "multimedia systems." But it said that in a few respects, the technical regulations adopted by the Commission "may unnecessarily restrict design flexibility and ... impair the capabilities of these devices." WINForum asked the FCC (1) to permit the operation of U-NII devices across

boundaries between the lower and middle-band segments, (2) to delete frequency-stability requirements, (3) to clarify U-NII signal-measurement techniques, and (4) to make a variety of other technical rule changes and clarifications.

To date, I have only been able to obtain the complete text of the Apple Petition for Reconsideration:

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)
)
Amendment of the Commission's Rules to) ET Docket No. 96-102
Provide for Operation of Unlicensed NII) RM-8648
Devices in the 5 GHz Frequency Range) RM-8653

PETITION FOR RECONSIDERATION

Apple Computer, Inc. ("Apple") hereby respectfully requests that the Federal Communications Commission ("Commission" or "FCC") reconsider in three respects its recent Report and Order in the above-referenced proceeding.[1]

First, Apple requests that the Commission expedite its consideration of whether to permit the use of more highly directional antennas for transmitters using the uppermost portion (5725-5825 MHz) of the Unlicensed National Information Infrastructure ("U-NII") band.[2]

Second, Apple requests that the Commission amend the antenna directionality rules for the middle U-NII sub-band (5250-5350 MHz).

Finally, Apple requests that the Commission amend the peak power spectral density ("PSD") limit for U-NII devices operating in the 5250-5350 MHz sub-band to 125mW/MHz and amend the PSD limit for U-NII devices operating in the 5725-5825 MHz sub-band to 1 Watt in 2 MHz, rather than 1 Watt in 20 MHz.[3]

- i. the commission should expedite its consideration of whether to permit u-nii devices operating in the 5725-5825 mhz band to use more highly directional transmit antennas.

Apple is one of the original proponents of unlicensed U-NII devices.[4] In addition to supporting generally the need for a high bandwidth unlicensed band in the 5 GHz range, Apple has been one of the principal advocates for the creation of unlicensed longer-distance "community networks." As such, Apple was pleased that the Commission has come to recognize the importance of community networks in helping to meet the communications needs of educational institutions, libraries, health care providers, and others,[5] and that the Report and Order therefore adopted power limits and other rules that will make possible at least a limited community networking function in a portion of the U-NII band.[6]

In the Report and Order, the Commission recognized that it may be appropriate to further accommodate community networking by permitting U-NII devices operating in the 5725-5825 MHz band to use more highly directional antennas than are permitted under the current rules.[7] The power and antenna directionality rules adopted for U-NII devices operating in the 5725-5825 MHz band are identical to those that currently apply to spread spectrum Part 15 devices operating in the 5725-5850 MHz band.[8] In a separate proceeding, however, the Commission is considering whether to permit 5 GHz spread spectrum devices to use more highly directional transmit antennas.[9] As a result, the Commission stated in the Report and Order that, if it decides in the other proceeding to permit the use of higher gain directional transmitting antennas for spread spectrum operations, it may consider in a separate rulemaking similar action for U-NII devices operating in the 5725-5825

MHz band.

Apple urges the Commission to consider in tandem, rather than seriatim, whether to increase the permitted antenna gain for both spread spectrum and U-NII systems operating in the 5725-5825 MHz band. Were the Commission to proceed as discussed in the Report and Order _ first deciding whether to increase antenna gain for spread spectrum systems, and only then deciding whether to increase antenna gain for U-NII systems _ its process would delay unnecessarily the potential introduction of beneficial longer range U-NII devices.

There are compelling policy reasons why the Commission should consider simultaneously the permissible antenna gain for spread spectrum and 5725-5825 MHz U-NII devices. Indeed, Apple first noted the interplay between the spread spectrum and U-NII proceedings seven months ago when it filed comments in ET Docket No. 96-9.

First, the core question of whether the use of more highly directional antennas will increase _ or instead reduce _ objectionable interference to others sharing the 5725-5850 MHz band can best be addressed if all relevant attributes of both spread spectrum and U-NII devices are "on the table" at the same time. Second, several commenters in this proceeding _ including WINForum, Microsoft, and Motorola _ already have addressed why the Commission should adopt and maintain parallel rules for spread spectrum and U-NII devices operating in the 5725-5825 MHz band. Third, the record in this proceeding already contains an extensive discussion of the need for longer distance community networks, as well as of the potential for interference between U-NII systems that employ directional antennas and other users of the 5725-5825 MHz band.

As a result of the above, there is no need for the Commission to start a new proceeding or to defer, until after a decision has been issued in the spread spectrum proceeding, its consideration of whether to permit higher gain antennas for U-NII devices operating in the 5725-5825 MHz band. Either such approach would force parties to duplicate much of the record that already exists in this proceeding, thereby wasting the Commission's resources and those of the public, as well as effectively guarantee that the introduction of longer range U-NII devices would be delayed by a year or more.

II. the commission also promptly should consider whether to permit the use of more highly directional transmit antennas in the 5250-5350 MHz band.

The arguments supporting the use of directional transmit antennas are as applicable to the middle U-NII band (5250-5350 MHz) as they are to the upper U-NII band (5725-5825 MHz). The one watt power limit for the middle band, by itself, is adequate to permit the creation of longer-reach community networks. The current rules, however, penalize directionality beyond that of a 6 dBi (essentially omnidirectional) antenna and, as a result, will frustrate the ability of manufacturers and users seeking to create community networks within this sub-band.

As Apple and others previously have discussed in this proceeding, the Commission should encourage, rather than penalize, the use of more highly directional transmit antennas. To do so, the Commission should amend the antenna directionality rules for 5250-5350 MHz U-NII devices at the same time that it amends the antenna directionality rules for 5725-5825 MHz U-NII devices and spread spectrum devices. Specifically, the Commission should replace its current rule (which requires a dB-for-dB back-off in transmit power for antennas with a directional gain of more than 6 dBi) with a rule requiring a back-off of 1 dB in power for each 3 dB of antenna gain in excess of 6 dBi. Alternately, the Commission could apply the same directionality rules to the middle U-NII band that it adopts for the upper U-NII band and for spread spectrum devices.

iii. the commission should amend the psd limits applicable

to the middle and upper U-NII sub-bands by basing the PSD limits on a 2 MHz rather than a 20 MHz bandwidth.

In the Report and Order, the Commission imposed peak PSD limits for each of the U-NII band segments. In the middle U-NII band, a limit of 12.5 mW/MHz for an antenna gain of 6 dBi was adopted; for the upper U-NII band, a limit of 50 mW/MHz for an antenna gain of 6 dBi was adopted.[10]

The Commission adopted its U-NII PSD rules in large part to encourage the use of the U-NII bands for the broadband operations for which they are intended.[11] While Apple recognizes the role the U-NII band will play in making available very high speed, short range communications, the rules governing the band should not be so strict that they make it impossible for U-NII devices also to satisfy the longer distance, somewhat lower bandwidth needs of those who will rely on community networks.

At this stage in the deployment of "wideband" services, an ISDN data rate (56 kbps) is a luxury for many, and a T1 (1.544 Mbps) unlicensed capability represents a major advance over the data rates that currently are available over wired networks only at very high monthly costs _ if at all _ to most individuals and organizations. Community networks must be able to provide T1 data rates over reasonable distances if they are to meet the immediate and near-term needs of many users, including rural schools, hospitals, and libraries. As a result, the Commission should amend its PSD rules so as to make it more feasible for U-NII links in the middle and upper portions of the U-NII band to support T1 and faster data rates over distances exceeding "several kilometers." [12]

Power density is, of course, a major determinant of the distances that can be achieved for line-of-sight paths. Under the spread spectrum rules, designers are free to respond to market forces, making tradeoffs between distance (as represented by the signal-to-noise ratio produced as a result of a PSD) and data rate (or bandwidth). Under the U-NII rules, these tradeoffs are not permitted: distance is essentially fixed, independent of bandwidth, because manufacturers must reduce their power (and hence achievable distance) in tandem with any reduction in bandwidth. This disparity not only violates the goal of functional and technological parity for U-NII devices vis-a-vis other unlicensed devices operating in the 5 GHz range.[13] In addition _ and even more importantly _ it will make it more difficult for U-NII devices to provide the bandwidths, T1 and up, at the distances that community networks will require.

Accordingly, the Commission should modify the PSD limit for U-NII devices operating in the 5725-5825 MHz band from 1 Watt in 20 MHz (50 mW/MHz) to 1 Watt in 2 MHz, or 500 mW/MHz. This change not only will ensure that U-NII devices are able to provide communications to those who are bypassed by other technologies, but also will create some degree of technological and distance-reaching parity between U-NII devices and spread spectrum devices at benchmark T1 data rates.

In addition, the Commission should modify the PSD limit for U-NII devices operating in the 5250-5350 MHz band from 0.250 Watts in 20 MHz (12.5 mW/MHz) to 0.250 Watts in 2 MHz, or 125 mW/MHz.

CONCLUSION

For the reasons stated herein, Apple respectfully requests that the FCC promptly consider whether to permit the use of more highly directional antennas by U-NII devices operating in the middle and upper U-NII sub-bands, and amend the peak PSD limits for U-NII devices operating in these sub-bands.

Respectfully submitted,

APPLE COMPUTER, INC.

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March 3, 1997

[1] Amendment of the Commission's Rules to Provide for Operation of Unlicensed NII Devices in the 5 GHz Frequency Range, Report and Order, ET Docket No. 96-102, FCC 97-5 (released Jan. 9, 1997).

[2] On February 13, 1997, Apple submitted a letter to the Office of Engineering and Technology in which it urged the Commission not to defer its consideration of whether to permit the use of more highly directional antennas by U-NII transmitters using the 5725-5825 MHz band, but rather to consider this question as part of the instant proceeding and, at most, to request additional comment on the narrow question of whether the U-NII rules should be changed to reflect any changes in the spread spectrum rules. In order to avoid any claim that Apple's letter did not provide an adequate basis for the Commission to expedite its consideration of the use of highly directional transmit antennas by U-NII devices, and in the event that the Commission would prefer to address this issue as part of its reconsideration process rather than through a request for additional comments, Apple is including this request in its Petition for Reconsideration.

[3] The Report and Order permits U-NII devices operating in the upper band to employ a peak PSD of 50 mW/MHz for an antenna gain of 6 dBi. Report and Order at 49. This corresponds to a PSD of 1 Watt in 20 MHz for an antenna gain of 6 dBi.

[4] Id. at 2.

[5] Id. at 18.

[6] Id. at 46.

[7] Id. at 47.

[8] Id. at 46. While the power and directionality rules are the same for U-NII and spread spectrum systems, U-NII devices are subject to much stricter PSD limits than are spread spectrum systems operating under 47 C.F.R. 15.247. As discussed below, this limits the capabilities of U-NII devices vis-a-vis spread spectrum devices, and this disparity should be addressed by the Commission.

[9] Id. at 47 (citing ET Docket No. 96-8).

[10] Id. at 49.

[11] Id. U-NII devices are defined as providing "wideband, high data rate" communications. 47 C.F.R. 15.403 (a).

[12] See id. at 46 (stating that the power limits adopted for U-NII devices operating in the upper band will provide community networks with a typical range of several kilometers, and that longer-range communications could be possible in rural and other areas with a low interference environment).

[13] Unlike U-NII devices, frequency hopping spread spectrum devices are subject to no limits on minimum bandwidth or maximum PSD; for example, a frequency hopping device that can convey T1-rate data in 1 MHz can utilize a PSD of 1 Watt/MHz (1000 mW/MHz), 13 dB greater than (or 20 times) the PSD limit for a U-NII device operating in the upper U-NII sub-band and 80 times the PSD limit for a U-NII device operating in the middle U-NII sub-band. Frequency hopping devices offering still lower data rates and bandwidths can utilize even higher PSDs. For example, to convey the rates achieved by new-generation telephone modems, 56 kbps, a frequency hopping system could use an on-channel RF bandwidth of 100 kHz; and the PSD could then be 10 Watts/MHz. Direct sequence spread spectrum systems also have an advantage over U-NII systems in this regard: for example, a direct sequence system conveying a 2 MHz data channel with a processing gain of 10 dB can offer a signal-to-noise ratio (after de-spreading) equivalent to that provided by a signal utilizing a PSD of 500 mW/MHz, 10 dB greater than (or 10 times) the PSD limit for a U-NII device operating in the upper U-NII sub-band and 40 times the PSD limit for a U-NII device operating in the middle U-NII sub-band.

This information came from Dewayne Hendricks, WA8DZP, Pacific Division Assistant Director, member of ARRL Future Systems Committee, and Chairman of TAPR Regulatory Committee. Editing and conversion of the original WP document was done by Glen Lokke, KE6NBO and relayed to me. Many thanks to Dewayne and Glen for all their work!

I am continuing to try to develop machine readable versions of the other two Petitions for Reconsideration. I have been promised hard copy of all three documents from ARRL HQ. I plan to convert the hard copy of the WINForum and HP petitions to machine readable when they arrive and forward them to you.

At the moment I have no idea of what the FCC will do with these petitions, nor any time schedule. It is my understanding that the ARRL plans to comment on the Apple Petition. If you would like to participate in preparing input to the ARRL Comments, please send the information to me for forwarding to ARRL HQ. In addition, you may wish to comment to the FCC directly. Please copy me on any direct comments to the FCC.

I continue to hope that this bulletin, previous bulletins, the text of ET Docket 96-102 as well as all the other information will be up on the ARRL Pacific Division Home Page on WWW --- (address <http://www.pdarrl.org/>). That process is suffering some "growing pains", but I hope that we will work our way through them soon.

See also the ARRL Home Page at <http://www.arrl.org/> and select "Band Threat News".

For those of you who wish to get the information concerning NII/SUPERNet Docket (ET Docket No. 96-102) directly from the FCC Web site ---

Here are the URL's:

Text version (without footnotes and special formatting):

<http://www.fcc.gov/Bureaus/Engineering_Technology/Notices/fcc96193.txt>

WordPerfect version (with footnotes and special formatting):

<http://www.fcc.gov/Bureaus/Engineering_Technology/Notices/fcc96193.wp>

More details will be sent to the Pacific Division 5725-5875 MHz Alert List and, hopefully, posted on the Pacific Division Home Page as soon as they are known.

Any thoughts on any of this by anyone would be appreciated!

Contact Brad Wyatt, K6WR, ARRL Pacific Division Director at k6wr@arrl.org or (408) 395-2501 if you can help in any way.

73, Brad Wyatt K6WR ARRL Pacific Division Director

162. Re: [SS:1190] Wireless Ethernet comments

From: Dave Koberstein <davek@komacke.com>
Date: Sat, 22 Mar 1997 11:26:38 -0800
To: ss@tapr.org
Message-ID: <3.0.1.32.19970322112638.006aed88@sydney>
Rendered body type: text/plain

Good point. FHSS wireless ethernet doesn't suffer from this problem to quite the same magnitude. This is the reason most (if not all) wireless enet manufactures have introduced or are introducing FHSS products on 2.4 GHz.

Not that this info changes the approach hams should take to the STA. Just thought you'd like to know.

> ----- At 12:23 PM 3/16/97 -0600, you wrote:
> A lot of people have been talking about using wireless ethernet DS
> modems. Also, people have commented on them not using power control, so why
> should we.
>
> DS Wireless ethernet is NOT CDMA, it is only DSSS. This means that
> every unit uses the same spreading sequence. Only one unit may transmit at
> a time, thus no need for power control, unless you have adjacent cells.
>
> DS SS is wasteful of spectrum if one does not use CDMA. Wireless
> ethernet uses a 11 chip spreading code, thus wasting 11 times the bandwidth
> necessary. If CDMA was used, more users could transmit at the same time,
> and there would be no waste.
>
> I think it is pointless to base anything on wireless ethernet, as it
> is wasteful, old technology, and not standardized. If we truly want to use
> spread spectrum properly, that implies we use CDMA as well, and that implies
> we do something custom.
>
> Matt
> N2MJI
>
> ----- End of Original -----

Dave Koberstein
keep in touch: davek@komacke.com / http://www.komacke.com
work: davek@proxim.com / http://www.proxim.com
ham internet: n9dk@n9dk.ampr.org [44.4.12.172]
(ax.25/PBBS: n9dk@w6yx.#nocal.ca.usa.noam)

163. TAPR Board Election -- Don't forget to vote!

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Sun, 23 Mar 1997 14:05:32 -0600
To: "APRS SIG list mailing" <aprssig@tapr.org>,
"DSP-93 Build" <dsp-93@tapr.org>,
"HF SIG list mailing" <hfsig@tapr.org>,
"NETSIG list mailing" <netsig@tapr.org>,
"BBS SIG list mailing" <bbssig@tapr.org>,
"TAPR/AMSAT DSP" <dsp@tapr.org>,
"TAPR-BB list mailing" <tapr-bb@tapr.org>,
"TAPR Regional Freq" <regional_freq@tapr.org>,
"tapr-tno" <tapr-tno@tapr.org>, "Spread Spectrum" <ss@tapr.org>
Message-ID: <v03007814af5b3a76bea5@208.134.134.40>
Rendered body type: text/plain

TAPR Board of Directors Elections

If you are a member of TAPR, don't forget to take the time to vote!

We have four people running for three places, so it could be your vote that

determines who is on the TAPR Board of Directors.

Deadline for balloting is March 30th, 1997.

This year, members of TAPR can vote either by mail in ballot or over the Internet using the world wide web. Check your PSR on how to submit your vote via the web.

Don't lose your PSR, because you will need information contained on your mail label. If you have problems using the web system, contact Dorothy at the office and we can look into the issue.

PSRs were mailed on March 5th, so all members should have them by now. If you have not received your PSR, call or send e-mail to the office and request a ballot be sent or request the necessary information to allow you to ballot using the on-line Web page.

**** DEADLINE March 30th! ****

Tucson Amateur Packet Radio
8987-309 E Tanque Verde Rd #337 * Tucson, Az * 85749-9399 * 817-383-0000

e-mail: TAPR@TAPR.ORG ftp: ftp.tapr.org web: <http://www.tapr.org/>

164. Still Alive !

From: "Larry P. Thomas WA0GWA" <lpthomas@winning-edge.com>
Date: Tue, 25 Mar 1997 15:38:01 -0600
To: ss@tapr.org
Message-ID: <2.2.32.19970325213801.00cc9454@winning-edge.com>
Rendered body type: text/plain

Have not seen any activity on this SIG since 3/23/97. My site was off a little this weekend ... wondering if I got bumped off the SIG for inability to be reached!

Later
Larry

Larry P. Thomas wa0gwa voice : 1 913 888-0282
Krell Technologies fax : 1 913 782-9359
8960 Bond pager : 1 816 989-HELP
Overland Park, KS 66214-1764 e-mail : lpthomas@winning-edge.com
 www : http://www.krell.com

165. Steve Bible, N7HPR, on Ham Radio and More

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Thu, 27 Mar 1997 22:12:24 -0600
To: "TAPR-BB list mailing" <tapr-bb@tapr.org>
Cc: " Spread Spectrum " <ss@tapr.org>
Message-ID: <v0300782faf60f5708361@[208.134.134.40]>
Rendered body type: text/plain

Just as a reminder....

TAPR's very own Steve Bible, N7HPR, will be a guest on Len Winkler's Ham Radio & More Show Sunday March 30th at 2300 UTC. The topic will be the New SPREAD SPECTRUM Plan.

Ham Radio & More Show information:

<http://www.goodnet.com/~lenwink/hrm.htm>

To listen to past Ham Radio & More Shows via Real Audio (Sponsored by TAPR):

<http://www.tapr.org/hrm>

The Ham Radio & More Show airs LIVE each Sunday at 6:00pm ET, (2300 utc), on:

- many local commercial stations throughout the country,
(See <http://www.goodnet.com/~lenwink/affil~1.htm> for listing)
- WWCR Shortwave, 5.070 MHz, and
- RealAudio at: <http://www.AudioNet.com/radio/business/kbnp>

(Thanks KBNP)

Also available tape delayed via WWCN Shortwave on Mondays, at 1000 utc on 3.210 MHz, and Sundays at 0600 utc on 5.070 MHz.

Tucson Amateur Packet Radio
8987-309 E Tanque Verde Rd #337 * Tucson, Az * 85749-9399 * 817-383-0000

e-mail: TAPR@TAPR.ORG ftp: ftp.tapr.org web: <http://www.tapr.org/>

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd

166. Re: [SS:1217] Still Alive !

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Sat, 29 Mar 1997 03:06:08 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199703290306.DAA14698@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

"Larry P. Thomas WA0GWA" <lpthomas@winning-edge.com> wrote:
> Have not seen any activity on this SIG since 3/23/97. My site was off a
> little this weekend ... wondering if I got bumped off the SIG for inability
> to be reached!

You won't get bumped off for transient mail problems - you have to be a
persistent offender. :-)

The recent quietude probably has something to do with March Break, n'est-ce pas?

Barry

--

Barry McLarnon VE3JF/VA3TCP	Internet: bm@hydra.carleton.ca
Ottawa Amateur Radio Club	AMPRnet: bm@lynx.ve3jf.ampr.org
Packet Working Group	Web: http://hydra.carleton.ca

167. 10 Ghz data link web page

From: Don Labriola <labriola@ix.netcom.com> (by way of Greg Jones, WD5IVD)
Date: Fri, 28 Mar 1997 09:31:34 -0600
To: " Spread Spectrum "<ss@tapr.org>,
"NETSIG list mailing"<netsig@tapr.org>
Message-ID: <v03007803af619489b8f1@208.134.134.40>
Rendered body type: text/plain

All,

The Tech Bench Elmers group in Southern California has added a page for
our data link project. We will be tracking our progress through it. Any
inputs or developments that you would like to share would be greatly
appreciated!

The page is:

<http://www.geocities.com/SiliconValley/2775/>

Look under 10Ghz data link....

73's de W6QS - Don Labriola

168. Steve Bible's HRM Show on-line

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Sun, 30 Mar 1997 22:56:57 -0600
To: "TAPR-BB list mailing"<tapr-bb@tapr.org>,
" Spread Spectrum "<ss@tapr.org>
Cc: " TAPR Board "<tapr-board@tapr.org>
Message-ID: <v03020705af64f0559c9b@208.134.134.40>
Rendered body type: text/plain

TAPR's very own Steve Bible, N7HPR, was a guest on Len Winkler's Ham Radio & More Show Sunday March 30th at 2300 UTC. The topic was the New SPREAD SPECTRUM Plan.

If you were not able to hear the show, it is now available on-line. To listen to the show you can visit either:

<http://www.tapr.org/ss>

or

<http://www.tapr.org/hrm>

Tucson Amateur Packet Radio
8987-309 E Tanque Verde Rd #337 * Tucson, Az * 85749-9399 * 817-383-0000

e-mail: TAPR@TAPR.ORG ftp: ftp.tapr.org web: <<http://www.tapr.org/>>

169. Re: [SS:1221] Steve Bible's HRM Show on-line

From: Tony McConnell <n3jly@erols.com>
Date: Mon, 31 Mar 1997 13:01:54 -0500
To: ss@tapr.org
Message-ID: <199703311801.NAA27030@smtp3.erols.com>
Rendered body type: text/plain

At 10:59 PM 3/30/97 -0600, you wrote:
>TAPR's very own Steve Bible, N7HPR, was a guest on Len Winkler's Ham Radio
>& More Show Sunday March 30th at 2300 UTC. The topic was the New SPREAD
>SPECTRUM Plan.

do we have a plan? that may sound silly, but do we?

April 1997

Original source file: ss.9704

Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9704

1. Metricom Expects to Provide 85K wireless data

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Tue, 1 Apr 1997 04:27:12 -0800
To: dewayne-net@warpspeed.com (Dewayne's Wireless News List), ss@tapr.org
Message-ID: <v03102516af66aef9b742@[204.118.182.22]>
Rendered body type: text/plain

Metricom Expects to Provide 85K wireless data

Source: Business Wire

LOS GATOS, Calif.--(BUSINESS WIRE) via Individual Inc. -- Metricom, Inc. (NASDAQ: MCOM) today announced it is developing new technology designed to dramatically increase data speeds on its wireless network. The new technology, code-named Autobahn, will utilize two bands of unlicensed spectrum: the 900 MHz band and the 2.4 GHz band, and will be compatible with the company's existing Ricochet networks. It will provide Ricochet subscribers with up to 85 kbps. of data speeds, and is scheduled to be ready for deployment in 1998.

The company also disclosed that it will be exploring the possible purchase of licensed spectrum, to augment its use of unlicensed spectrum and to further enhance Ricochet network performance. In this regard, the company announced that it has filed an application with the Federal Communications Commission to bid on spectrum in the upcoming Wireless Communications Services (WCS) auctions.

Bob Dilworth, CEO and Chairman of Metricom, said, "We believe the addition of a limited amount of licensed spectrum to our proprietary, unlicensed spectrum architecture will enable us to further increase the data speeds of our Ricochet networks." He commented that, "Based on the current work of our design teams and on an architecture code-named "Starlite," we believe a combination of unlicensed and licensed spectrum will enable us to offer wireless, wide-area network data speeds of up to 256 kbps." The WCS auction is one of the licensed spectrum opportunities the company is reviewing.

"Metricom has refined and successfully commercialized its proprietary Ricochet wireless data network technology over the last five years," said Don Wood, executive vice president of Metricom. "The company now has Ricochet networks installed in three metropolitan areas, including the San Francisco Bay Area, Seattle and Washington D.C., twelve university campuses and eight major airports, and we have over 12,000 Ricochet customers. We understand our target market segments and our customers' needs, and we believe we are uniquely positioned today to meet those needs. Our work on both the Autobahn and Starlite projects has been made possible by our singular focus over the years on data, by Ricochet's unique mesh architecture and microcellular design, and by the experience we have gained from the commercial deployment and marketing of our existing Ricochet network services."

The Autobahn product will build upon and be compatible with Metricom's current wireless data network which uses spread-spectrum, frequency-hopping, packet-data technology. Metricom believes that pushing the envelope on speed and performance is key to maintaining the leadership position it has claimed in its category of wireless data communications.

About Metricom

Metricom, Inc. is a leading provider of wide-area, wireless data communications network solutions with the fastest-growing subscriber rate in its category. The company's Ricochet Products and Services division, headquartered in Los Gatos, California, provides portable and desktop computer users with high-performance, cost-effective wireless access to the Internet, private intranets, local-area networks, e-mail and other online services. The Ricochet service is faster and more affordable than all other portable wireless service alternatives, and is also competitive with traditional phone networks on desktops, from both a performance and price perspective. Ricochet service is currently available in the greater San Francisco Bay Area, Seattle, and Washington, D.C., and on several university campuses and airports

throughout the United States.

Metricom's Industrial Communications division provides both private networks and communications services to the electric, gas, oil and water industries. The private network solutions are based on Metricom's UtiliNet products which currently serve over 100 installations across the United States. The Industrial Communications services are offered on the same networks providing Ricochet services.

Metricom was founded in 1985. The company's stock is traded under the NASDAQ symbol: MCOM. For more information, call 1-800 Go-Wireless or visit Metricom's Web site at <http://www.metricom.com>.

Metricom and Ricochet are registered trademarks of Metricom, Inc. All other trademarks are the property of their respective owners.

CONTACT: Metricom | Susan Kohl, 408/399-8198 (public relations) | skohl@metricom.com | Pager 1-800 949-3164 | or | Ann Candalerio, 408/399-8113 (investor relations) | ann@metricom.com

[03-31-97 at 09:09 EST, Business Wire]

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~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
Warp Speed Imagineering ! Internet: [dewayne@warpspeed.com](mailto:dewayne@warpspeed.com)  
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM  
Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>  
Fax: (510) 770-9854 !  
~~~~~

2. Announcement: New Modulation Technique

From: jral854@tntech.edu (Jeffrey Austen)
Date: Tue, 01 Apr 1997 10:33:55 -0600
To: ss@tapr.org
Message-ID: <[v01540b01af66d5bf7809@\[149.149.39.26\]](mailto:v01540b01af66d5bf7809@[149.149.39.26])>
Rendered body type: text/plain

PRESS RELEASE

Rickman, TN -- University of Rickman -- Office of Research Scientists at the University of Rickman (Rickman, TN) are once again pressing the frontiers in telecommunication system research. This week the telecommunications research laboratory team has released a new and revolutionary communication system architecture. This architectural concept utilizes a unique combination of several well-known techniques: spread spectrum modulation, data compression algorithms, and advanced modulation and pulse shaping methods. When used individually, each of these techniques has limitations which prevent the complete system from achieving optimum efficiency, however, when combined in certain ways the shortcoming of each individual techniques is overcome by the advantage gained by using a complementary technique. This eliminates the classical restrictions on communications and allows for the achievement of new levels of system throughput.

A benchmark system is being prototyped at the UoR. Although all aspects of the system have not yet been completed it is already demonstrating new levels of bandwidth efficiency by combining spread-spectrum (SS), code-division multiple access (CDMA), and Fourier-based pulse shaping technologies. As is well-known, SS and CDMA achieve high performance and channel sharing by spreading out the signal such that it occupies a much larger bandwidth than that which is required to transmit the data. This expansion of bandwidth, mistakenly called the processing gain, is a necessary characteristic of traditional spread-spectrum systems and provides tremendous throughput for a given transmitter power. It, however, causes the signal to occupy much more spectrum than other modulation methods and prevents the sharing of that extremely wide occupied frequency band with other users. The benchmark system eliminates the wasteful bandwidth expansion of SS modulation by adding trellis coded modulation (TCM), M-ary orthogonal signaling and Fourier-based pulse shaping to the basic SS system. These techniques have previously been used effectively in telephone-computer modems to achieve high throughput in a small bandwidth. In the benchmark system these are combined by coding each chip in the spread-spectrum sequence with TCM followed by pulse shaping and then modulating a M-ary modulator with the resultant waveforms. This combination enables the power efficiency of SS and the bandwidth efficiency of TCM and pulse shaping to be achieved simultaneously in one system.

The new method, called the fully orthogonal optimal lattice modulation technique, is being released under a patent with conditions similar to the GNU copyright for software. The public release of this system is necessitated by the desire to have it in production in time to be used on the new 5 GHz license-free bands; this royalty-free licensing will allow rapid development and deployment of the GNU fully orthogonal optimal lattice (GNU FOOL) system.

Work is proceeding on the integration of data compression algorithms into the system and a prototype was functional at one time. Unfortunately, in a freak laboratory accident in which consumption of excessive quantities of JOLT cola was a contributing factor, the only copy of the data compression source code was accidentally transmitted through the system. The victims are in stable condition and resting well; efforts to recover the software are continuing.

News Contact: University of Rickman, Bill Pournell, (615) 555-1212

HOLD FOR RELEASE

Release Date: April 1, 1997.

3. Freewave setup - offtopic

From: Bob Lorenzini <hwm@netcom.com>
Date: Tue, 1 Apr 1997 14:03:35 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970401135936.643A-100000@mm.wd6dod.ampr.org>
Rendered body type: text/plain

Sorry for the offtopic post but I need some pointers to routing multiple W95/Freewave's to linux/Freewave router. Can anyone point me in the right direction?

Bob - wd6dod

4. Re: [SS:1223] Metricom Expects to Provide 85K wireless data

From: Jeff King <jeff@mich.com>
Date: Wed, 02 Apr 1997 12:02:59 -0500
To: dewayne@warpspeed.com
Cc: ss@tapr.org, ss-sta@tapr.org
Message-ID: <2.2.32.19970402170259.008eef04@mail.mich.com>
Rendered body type: text/plain

At 06:32 AM 4/1/97 -0600, Dewayne Hendricks wrote:
>Metricom Expects to Provide 85K wireless data
>
>
>Source: Business Wire
>
>LOS GATOS, Calif.--(BUSINESS WIRE) via Individual Inc. -- Metricom, Inc.
>(NASDAQ: MCOM) today announced it is developing new technology designed
>to dramatically increase data speeds on its wireless network. The new
>technology, code-named Autobahn, will utilize two bands of unlicensed
>spectrum: the 900 MHz band and the 2.4 GHz band, and will be compatible
>with the company's existing Ricochet networks. It will provide Ricochet
>subscribers with up to 85 kbps. of data speeds, and is scheduled to be
>ready for deployment in 1998.
>

Dewayne:

Any more technical details available? I'm assuming (maybe?) they will be using the 900mhz as a back channel with some sort of full duplex arrangement to help the throughput.

It would be interesting to hear a case study of the trials and tribulations Metricom has had in deploying its FH network. Its also odd to note that the move to 85 kbps is characterized as "dramatically increase data speeds on its wireless network". One has to wonder what the present throughput is based on that statement.

Regards,

| Jeff King Aero Data Systems |

| jeff@mich.com P.O. Box 510895 |
| (810)471-1787 Livonia, MI 48151 |
F(810)471-0279 United States

5. Re: [SS:1225] Freewave setup - offtopic

From: Jeff King <jeff@mich.com>
Date: Wed, 02 Apr 1997 12:07:52 -0500
To: ss@tapr.org, hwm@netcom.com
Message-ID: <2.2.32.19970402170752.0090e120@mail.mich.com>
Rendered body type: text/plain

At 04:06 PM 4/1/97 -0600, Bob Lorenzini wrote:
> Sorry for the offtopic post but I need some pointers to routing multiple
> W95/Freewave's to linux/Freewave router. Can anyone point me in the right
> direction?
>
> Bob - wd6dod
>

Bob:

A little more detail would help. Do you wish to use one freewave
radio at the LINUX site (your master)? Or do you wish to use multiple
freewaves at the main (linux) router site?

One thing I've never had any luck is in getting WIN95 built-in PPP/
winsock to work with the FreeWave's. I've had to use Trumpet Winsock.
The native WIN95 winsock PPP expects a modem and doesn't seem to
want to work with a direct connect (as the freewave appears). If
anyone has had any luck with this I'd like to hear.

Regards,

| Jeff King Aero Data Systems |
| jeff@mich.com P.O. Box 510895 |
| (810)471-1787 Livonia, MI 48151 |
F(810)471-0279 United States

6. RE: 1226] Re: Metricom Expects to Provide 85K wireless data

From: Ron Haley <ronhaley@dgps.com>
Date: Wed, 2 Apr 1997 11:42:32 -0800
To: "ss@tapr.org" <ss@tapr.org>
Message-ID: <01BC3F5A.F63F6E90@DIFFSERV>
Rendered body type: text/plain

I use the current service, and it generally provides between 14.4 and 28.8 kbps.

-----Original Message-----

From: Jeff King [SMTP:jeff@mich.com]
Sent: Wednesday, April 02, 1997 9:04 AM
To: ss@tapr.org
Subject: [SS:1226] Re: Metricom Expects to Provide 85K wireless data

At 06:32 AM 4/1/97 -0600, Dewayne Hendricks wrote:
>Metricom Expects to Provide 85K wireless data
>
>
>Source: Business Wire
>
>LOS GATOS, Calif.--(BUSINESS WIRE) via Individual Inc. -- Metricom, Inc.
>(NASDAQ: MCOM) today announced it is developing new technology designed
>to dramatically increase data speeds on its wireless network. The new
>technology, code-named Autobahn, will utilize two bands of unlicensed
>spectrum: the 900 MHz band and the 2.4 GHz band, and will be compatible
>with the company's existing Ricochet networks. It will provide Ricochet
>subscribers with up to 85 kbps. of data speeds, and is scheduled to be
>ready for deployment in 1998.
>

Dewayne:

Any more technical details available? I'm assuming (maybe?) they will
be using the 900mhz as a back channel with some sort of full duplex
arrangement to help the throughput.

It would be interesting to hear a case study of the trials and tribulations Metricom has had in deploying its FH network. Its also odd to note that the move to 85 kbps is characterized as "dramatically increase data speeds on its wireless network". One has to wonder what the present throughput is based on that statement.

Regards,

```
-----
| Jeff King      Aero Data Systems |
| jeff@mich.com  P.O. Box 510895   |
| (810)471-1787  Livonia, MI 48151 |
| F(810)471-0279 United States     |
-----
```

7. Re: [SS:1225] Freewave setup - offtopic

From: Bob Lorenzini <hwm@netcom.com>
Date: Wed, 2 Apr 1997 12:32:54 -0800 (PST)
To: Jeff King <jeff@mich.com>
Cc: ss@tapr.org, hwm@netcom.com
Message-ID: <Pine.LNX.3.95.970402122230.92D-100000@mm.wd6dod.ampr.org>
Rendered body type: text/plain

On Wed, 2 Apr 1997, Jeff King wrote:

> A little more detail would help. Do you wish to use one freewave
> radio at the LINUX site (your master)? Or do you wish to use multiple
> freewaves at the main (linux) router site?

There will be one FreeWave/Linux box serving data collection laptops (W95) on a navy base. This brings up something that was bothering me as I have never used PPP for other than point to point and I wonder if it is even capable of point to multipoint.

>
> One thing I've never had any luck is in getting WIN95 built-in PPP/
> winsock to work with the FreeWave's. I've had to use Trumpet Winsock.
> The native WIN95 winsock PPP expects a modem and doesn't seem to
> want to work with a direct connect (as the freewave appears). If
> anyone has had any luck

Thanks for the tip. Much appreciated.

Bob - wd6dod

8. Re: Metricom Expects to Provide 85K wireless data

From: Jim Jefferson <cjeffers@luminet.net>
Date: Wed, 02 Apr 1997 16:31:10 -0600
To: ss@tapr.org
Message-ID: <1.5.4.32.19970402223110.0068e2bc@luminet.net>
Rendered body type: text/plain

>Any more technical details available? I'm assuming (maybe?) they will
>be using the 900mhz as a back channel with some sort of full duplex
>arrangement to help the throughput.
>

>It would be interesting to hear a case study of the trials and
>tribulations Metricom has had in deploying its FH network. Its
>also odd to note that the move to 85 kbps is characterized
>as "dramatically increase data speeds on its wireless network".
>One has to wonder what the present throughput is based on that
>statement.

Jeff, I was lucky enough to attend a conference given by the CEO of Metricom at the AAAS meetings this year. I must say that his lecture was excellent!

For what I understood it sounded like they (Metricom) could guarantee at least 9600Kbs throughput, but the average user got about 33.6Kbs throughput. In the conference center we were in (big brick building) we were getting awful throughput I must say.

I also wonder what is the cost going to be to transfer over to a new network?

73's de

Jim Jefferson KB0THN
cjjeffers@luminet.net

<http://www.luminet.net/~cjjeffers/>

Jim's KB0THN Satellite Page!

9. Re: [SS:1226] Re: Metricom Expects to Provide 85K wireless data

From: David G Taylor <taylord@ecn.purdue.edu>

Date: Wed, 2 Apr 1997 17:32:30 -0500 (EST)

To: ss@tapr.org

Message-ID: <v03007802af682b7fc4d5@[128.46.169.162]>

Rendered body type: text/plain

>At 06:32 AM 4/1/97 -0600, Dewayne Hendricks wrote:
>>Metricom Expects to Provide 85K wireless data
>>
>>
>>Source: Business Wire
>>
>>LOS GATOS, Calif.--(BUSINESS WIRE) via Individual Inc. -- Metricom, Inc.
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>>technology, code-named Autobahn, will utilize two bands of unlicensed
>>spectrum: the 900 MHz band and the 2.4 GHz band, and will be compatible
>>with the company's existing Ricochet networks. It will provide Ricochet
>>subscribers with up to 85 kbps. of data speeds, and is scheduled to be
>>ready for deployment in 1998.
>Dewayne:
>
>Any more technical details available? I'm assuming (maybe?) they will
>be using the 900mhz as a back channel with some sort of full duplex
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>It would be interesting to hear a case study of the trials and
>tribulations Metricom has had in deploying its FH network. Its
>also odd to note that the move to 85 kbps is characterized
>as "dramatically increase data speeds on its wireless network".
>One has to wonder what the present throughput is based on that
>statement.
>Regards,
>-----
>| Jeff King Aero Data Systems |

This is probably Metricom Marketing speaking, with "dramatically increase data speeds" in comparison to 33k or 28k8 data rates on phone lines and/or their Ricochet system which I think is 28kbps max..

(Am cordless; will travel.) --taylord@ecn.purdue.edu

10. Re: [SS:1225] Freewave setup - offtopic

From: Jeff King <jeff@mich.com>

Date: Wed, 02 Apr 1997 18:14:02 -0500

To: Bob Lorenzini <hwm@netcom.com>

Cc: ss@tapr.org, hwm@netcom.com

Message-ID: <2.2.32.19970402231402.006bccb4@mail.mich.com>

Rendered body type: text/plain

At 12:32 PM 4/2/97 -0800, Bob Lorenzini wrote:
>
>
>On Wed, 2 Apr 1997, Jeff King wrote:
>
>> A little more detail would help. Do you wish to use one freewave
>> radio at the LINUX site (your master)? Or do you wish to use multiple
>> freewaves at the main (linux) router site?
>
> There will be one FreeWave/Linux box serving data collection
>laptops (W95) on a navy base. This brings up something that was
>bothering me as I have never used PPP for other than point to point
>and I wonder if it is even capable of point to multipoint.
>

No, PPP is not capable of multi-point. However, SLIP is and I have used that in the past with the freewaves. The 'stock' multi-point mode is not very robust in the FreeWave however. You might be able to use the TDMA mode, which is a separate firmware for the freewave.

Also, mode '6' might be of value you to you on the freewaves. It wouldn't support IP out of the box, but it sounds like you don't need these boxes on the net... hence you could just write a ap to service them. Mode 6 allows you to address individual freewave boxes.

Regards,

```
-----
| Jeff King      Aero Data Systems |
| jeff@mich.com  P.O. Box 510895   |
| (810)471-1787  Livonia, MI 48151 |
| F(810)471-0279 United States     |
-----
```

11. Re: [SS:1230] Re: Metricom Expects to Provide 85K wireless data

From: Carol Byers <crlbyer@garlic.com>
Date: Wed, 02 Apr 1997 16:21:14 -0800
To: ss@tapr.org
Message-ID: <3342F7FA.32C7@garlic.com>
Rendered body type: text/plain

Jim Jefferson wrote:

```
>
> >Any more technical details available? I'm assuming (maybe?) they will
> >be using the 900mhz as a back channel with some sort of full duplex
> >arrangement to help the throughput.
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> at the AAAS meetings this year. I must say that his lecture was excellent!
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> For what I understood it sounded like they ( Metricom ) could guarantee
> at least 9600Kbs throughput, but the average user got about 33.6Kbs throughput.
> In the conference center we were in ( big brick building ) we were getting awful
> throughput I must say.
>
> I also wonder what is the cost going to be to transfer over to a new network?
>
> 73's de
>
> Jim Jefferson KB0THN
> cjeffers@luminet.net
> http://www.luminet.net/~cjeffers/      Jim's KB0THN Satellite Page!
I have been evaluating this service for the past six months, and find it
to be very reliable, good throughput ( 19.2kbps to 28.8 kbps), and very
easy to use. We have it setup with an IP Gateway to our networks, and
find it to be an excellent service.
```

I believe that they will meet their new speed-goal in 1998.

Carol, W9HGI

12. Re: [SS:1225] Freewave setup - offtopic

From: Jeff King <jeff@mich.com>
Date: Wed, 02 Apr 1997 19:27:06 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19970403002706.00a04388@mail.mich.com>
Rendered body type: text/plain

At 12:32 PM 4/2/97 -0800, Bob Lorenzini wrote:

```
>
>
>On Wed, 2 Apr 1997, Jeff King wrote:
>
>> A little more detail would help. Do you wish to use one freewave
>> radio at the LINUX site (your master)? Or do you wish to use multiple
>> freewaves at the main (linux) router site?
>
> There will be one FreeWave/Linux box serving data collection
>laptops (W95) on a navy base. This brings up something that was
>bothering me as I have never used PPP for other than point to point
```

>and I wonder if it is even capable of point to multipoint.
>

No, PPP is not capable of multi-point. However, SLIP is and I have used that in the past with the freewaves. The 'stock' multi-point mode is not very robust in the FreeWave however. You might be able to use the TDMA mode, which is a separate firmware for the freewave.

Also, mode '6' might be of value to you on the freewaves. It wouldn't support IP out of the box, but it sounds like you don't need these boxes on the net... hence you could just write a ap to service them. Mode 6 allows you to address individual freewave boxes.

Regards,

```
-----
| Jeff King      Aero Data Systems |
| jeff@mich.com  P.O. Box 510895   |
| (810)471-1787  Livonia, MI 48151 |
| F(810)471-0279 United States     |
-----
```

13. Re: [SS:1229] Re: Freewave setup - offtopic

From: Eric Johnson <dej@edge.net>
Date: Wed, 02 Apr 1997 18:32:22 -0600
To: ss@tapr.org
Message-ID: <3.0.1.32.19970402183222.0068ef38@edge.net>
Rendered body type: text/plain

At 02:39 PM 4/2/97 -0600, you wrote:

>> One thing I've never had any luck is in getting WIN95 built-in PPP/
>> winsock to work with the FreeWave's. I've had to use Trumpet Winsock.
>> The native WIN95 winsock PPP expects a modem and doesn't seem to
>> want to work with a direct connect (as the freewave appears). If
>> anyone has had any luck

Check out .. <http://www.vt.edu:10021/K/kewells/net/>

It is a modem definition file for WIN95 using a direct connection.

--Eric

```
~~~~~
Eric Johnson, N4SCS      ! dej@edge.net
Research Electronics Inc. ! WWW: http://edge.edge.net/~dej
515 S. Old Kentucky Rd  ! REI WWW: http://www.multipro.com/research
Cookeville, TN 38501    !
Phone: (615)528-5756    !
Fax: (615)528-7854      !
~~~~~
```

14. Re: [SS:1223] Metricom Expects to Provide 85K wireless data

From: Steve Stroh <strohs@halcyon.com>
Date: Wed, 2 Apr 1997 16:54:42 -0800 (PST)
To: TAPR Spread Spectrum SIG Mailing List <ss@tapr.org>
Message-ID: <Pine.Ult.3.96.970402162844.1369E-100000@chinnook.halcyon.com>
Rendered body type: text/plain

On Tue, 1 Apr 1997, Dewayne Hendricks wrote:

> Metricom Expects to Provide 85K wireless data
>
> Source: Business Wire
>
> LOS GATOS, Calif.--(BUSINESS WIRE) via Individual Inc. -- Metricom, Inc.
> (NASDAQ: MCOM) today announced it is developing new technology designed
> to dramatically increase data speeds on its wireless network. The new
> technology, code-named Autobahn, will utilize two bands of unlicensed
> spectrum: the 900 MHz band and the 2.4 GHz band, and will be compatible
> with the company's existing Ricochet networks. It will provide Ricochet
> subscribers with up to 85 kbps. of data speeds, and is scheduled to be
> ready for deployment in 1998.
>
> The company also disclosed that it will be exploring the possible
> purchase of licensed spectrum, to augment its use of unlicensed spectrum

> and to further enhance Ricochet network performance. In this regard, the
> company announced that it has filed an application with the Federal
> Communications Commission to bid on spectrum in the upcoming Wireless
> Communications Services (WCS) auctions.

Perhaps to add some insight to this. George Flammer of Metricom spoke to the Puget Sound Amateur Radio TCP/IP Group about the Ricochet system that had (then) just recently been activated in the Seattle metro area. One of the questions that got asked is isn't it counterproductive to "compete" with your customers by using the same band (902-928 MHz) to communicate between the poletop units? Isn't that "stealing" potential bandwidth away from your customers? George replied Yes, that was a known (potential) issue, and Metricom was looking seriously at making use of a second band for communicating between the poletop units.

It seemed to me that the use of a second band was the only way Ricochet would be able to scale to be able to accomodate the customer base of a major city such as Chicago, LA, or NYC.

Steve N8GNJ

--
Steve Stroh Woodinville, Washington, USA strohs@halcyon.com

15. Re: Freewave setup - offtopic

From: Jerrold E Gallagher <jerry@nccn.net>
Date: Wed, 02 Apr 1997 23:09:23 -0800
To: Jeff King <jeff@mich.com>
Cc: ss@tapr.org
Message-ID: <334357A3.493E@nccn.net>
Rendered body type: text/plain

ss@tapr.org wrote:
>
> SS Digest 283
>
> Date: Wed, 2 Apr 1997 12:32:54 -0800 (PST)
> From: Bob Lorenzini <hwm@netcom.com>
> To: Jeff King <jeff@mich.com>
> Subject: Re: Freewave setup - offtopic
> Message-ID: <Pine.LNX.3.95.970402122230.92D-100000@mm.wd6dod.ampr.org>
>
> On Wed, 2 Apr 1997, Jeff King wrote:
>
> > A little more detail would help. Do you wish to use one freewave
> > radio at the LINUX site (your master)? Or do you wish to use multiple
> > freewaves at the main (linux) router site?
>
> There will be one FreeWave/Linux box serving data collection
> laptops (W95) on a navy base. This brings up something that was
> bothering me as I have never used PPP for other than point to point
> and I wonder if it is even capable of point to multipoint.
>
> >
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> > The native WIN95 winsock PPP expects a modem and doesn't seem to
> > want to work with a direct connect (as the freewave appears). If
> > anyone has had any luck
>
> Thanks for the tip. Much appreciated.
>
> Bob - wd6dod
>
> Date: Wed, 2 Apr 1997 16:54:42 -0800 (PST)
> From: Steve Stroh <strohs
> > > >
> End of SS Digest 283
> *****

Somebody, please, forward to WD6DOD and to whomever it may concern:
It's just an idea you might try for getting the native WIN95 winsock PPP to work; viz., from the desk top, go into My Computer | Control Panel | Add/Remove Programs and select the WINDOWS SETUP tab in Add/Remove Programs Properties, then select the details box for the Communications []group and check to see that the []Direct Cable Connection box is checked. If it isn't, check it and back out with apply and close to save everything with the "Cable Connection" now active. 'Hope this works,
73, de: Jerrold E Gallagher, K6LYR <jerry@nccn.net>

--
jerry@nccn.net

16. Re: [SS:1223] Metricom Expects to Provide 85K wireless data

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Thu, 3 Apr 1997 14:19:44 -0700
To: Jeff King <jeff@mich.com>
Cc: ss@tapr.org, ss-sta@tapr.org
Message-ID: <v0310260aaf69cd72886d@[192.160.122.32]>
Rendered body type: text/plain

At 12:02 PM -0500 4/2/97, Jeff King wrote:

>
>Any more technical details available? I'm assuming (maybe?) they will
>be using the 900mhz as a back channel with some sort of full duplex
>arrangement to help the throughput.
>

I don't have anything more to add than what Steve Stroh posted in response to your query. My understanding is that they will use 2.4 GHz for their backbone.

You may be interested to know that today, the FCC Commissioner's voted to allow unlimited antenna gain for unlicensed Part 15 spread spectrum devices (Part 15.247) on the 2.4 and 5.8 GHz bands. So the 4 W EIRP limit on those bands is a thing of the past. This will make it a LOT easier to operate such longer range links as Metricom has in mind. Then again, it may also make the amateur radio service a bit less attractive to those who are interested in setting up high-speed Internet links. Time will tell....

>It would be interesting to hear a case study of the trials and
>tribulations Metricom has had in deploying its FH network. Its
>also odd to note that the move to 85 kbps is characterized
>as "dramatically increase data speeds on its wireless network".
>One has to wonder what the present throughput is based on that
>statement.

The only thing that I am aware of in terms of a case study is an old paper from 1993 that was written by Mike Pettus of Metricom (he's a long-time ham) on the technical details of their network.

As for the 85 kbps, well as a current user of their network, if they can do that they are going to have LOTS of very happy customers!! The problem is having to wait until 1988 for it to happen.

-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com  
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM  
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>  
Fax: (510) 770-9854 !  
~~~~~

17. DC blocks for those of you who have older NCR Wavelan cards

From: Bernie Doehner <bad@ece.WPI.EDU>
Date: Thu, 3 Apr 1997 18:56:11 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.HPP.3.95.970403185340.17906A-100000@cwins3.WPI.EDU>
Rendered body type: text/plain

Hi:

I just bought two Radio Shack CATV DC blocks and swept them on our network analyzer.

I was quite surprised when I found the loss to be

0.2-0.25 dB/DC block.

So, I'll be using them with my loop yagi to keep the Wavelan cards happy.

Best Regards,

Bernie NU1S

18. Re: [SS:1232] Re: Freewave setup - offtopic

From: Phil Karn <karn@qualcomm.com>
Date: Thu, 3 Apr 1997 21:26:53 -0800 (PST)
To: ss@tapr.org
Message-ID: <199704040526.VAA13186@servo.qualcomm.com>
Rendered body type: text/plain

>No, PPP is not capable of multi-point. However, SLIP is and I have
>used that in the past with the freewaves. The 'stock' multi-point

Eh? Both PPP and SLIP are point-to-point protocols.

Phil

19. Re: [SS:1240] Re: Freewave setup - offtopic

From: Jeff King <jeff@mich.com>
Date: Fri, 04 Apr 1997 02:29:36 -0500
To: ss@tapr.org, ss@tapr.org
Message-ID: <2.2.32.19970404072936.00738368@mail.mich.com>
Rendered body type: text/plain

At 11:42 PM 4/3/97 -0600, Phil Karn wrote:
>>No, PPP is not capable of multi-point. However, SLIP is and I have
>>used that in the past with the freewaves. The 'stock' multi-point
>
>Eh? Both PPP and SLIP are point-to-point protocols.
>
>Phil
>

PPP will only work point to point. SLIP can be made to work on
a multi-drop line (or on a freewave). Try it, it works. I've
done it using Livingston port masters, and MAC and PC's
running winsock. The spec may not read that way but it
can be made to work.

Regards,

| Jeff King Aero Data Systems |
| jeff@mich.com P.O. Box 510895 |
| (810)471-1787 Livonia, MI 48151 |
F(810)471-0279 United States

20. Question on OCI "RF Engine"

From: "James D. Cronin" <jdc@dos.nortel.com>
Date: Fri, 4 Apr 1997 07:57:52 -0500
To: ss@tapr.org
Message-ID: <9704040757.ZM4774@sun144>
Rendered body type: text/plain

I recently received a blurb on a spread spectrum radio/modem combo for 900
Mhz. They have info on their web page, <http://www.ocilawn.com/200-rfe.htm>

Is this suitable for connection to the header of a TNC-2? Would there
be interest in a group purchase?

It may be good only for short links, but we have a reasonable number of
them in our area, and it would lower frequencies for longer hops.

73..Jim N2VNO

21. Re: [SS:1239] DC blocks for those of you who have older NCR Wavelan cards

From: Jack Taylor <n700@goodnet.com>
Date: Fri, 4 Apr 1997 08:49:18 -0700 (MST)
To: ss@tapr.org
Message-ID: <Pine.GS0.3.95.970404084645.19907D-100000@goodguy>
Rendered body type: text/plain

Hi Bernie, thanks for the tip and what frequency range did you sweep these
for?

73 de Jack

On Thu, 3 Apr 1997, Bernie Doehner wrote:

> Hi:
>
> I just bought two Radio Shack CATV DC blocks and swept them on our network

> analyzer.
>
> I was quite surprised when I found the loss to be
>
> 0.2-0.25 dB/DC block.
>
> So, I'll be using them with my loop yagi to keep the Wavelan cards happy.
>
> Best Regards,
>
> Bernie NU1S
>
>

22. Re: [SS:1243] Re: DC blocks for those of you who have older NCR Wavelan cards

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Fri, 4 Apr 1997 12:25:09 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.970404122117.7834A-100000@uhf.wdc.net>
Rendered body type: text/plain

> Hi Bernie, thanks for the tip and what frequency range did you sweep these
> for?
>
> 73 de Jack
>

Hi Jack:

Sorry!!! Forgot to mention that. 902-928 MHz. And the 0.2-0.25 dB loss is voltage (not power loss) (50 ohm input/output ports).

Best Regards,

Bernie

> > Hi:
> >
> > I just bought two Radio Shack CATV DC blocks and swept them on our network
> > analyzer.
> >
> > I was quite surprised when I found the loss to be
> >
> > 0.2-0.25 dB/DC block.
> >
> > So, I'll be using them with my loop yagi to keep the Wavelan cards happy.
> >
> > Best Regards,
> >
> > Bernie NU1S
> >
> >
> >
> >

23. Re: [SS:1244] Re: DC blocks for those of you who have older NCR Wavelan cards

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Sat, 5 Apr 1997 03:40:33 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199704050340.DAA25906@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

Bernie Doehner <bad@uhf.wireless.net> wrote:

> > Hi Bernie, thanks for the tip and what frequency range did you sweep
> > these
> > for?
> >
> > 73 de Jack
> >
> >
> Hi Jack:
>
> Sorry!!! Forgot to mention that. 902-928 MHz. And the 0.2-0.25 dB
> loss is
> voltage (not power loss) (50 ohm input/output ports).

Say what? Anything expressed in dB is a power ratio, by definition.
If you measured voltages, then the loss is $20\log(V_{out}/V_{in})$ dB,
assuming that the ports have the same impedance. There's no such

thing as "voltage loss" expressed in dB.

And wouldn't a CATV widget be 75 ohms, not 50?

Cheers,

Barry

--

Barry McLarnon	VE3JF/VA3TCP		Internet:	bm@hydra.carleton.ca
Ottawa Amateur Radio Club			AMPRnet:	bm@lynx.ve3jf.ampr.org
Packet Working Group			Web:	http://hydra.carleton.ca

24. [SS:1239] DC blocks for those of you who have older NCR Wavelan cards

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Sat, 5 Apr 1997 01:04:50 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.970405010300.501D-100000@uhf.wdc.net>
Rendered body type: text/plain

Slight correction: The 0.2-0.25 dB/connector is a power loss, not a voltage loss. I appologize for the incorrect statement.

Bernie

25. (no subject)

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Sat, 5 Apr 1997 01:14:25 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.970405010506.501E-100000@uhf.wdc.net>
Rendered body type: text/plain

> If you measured voltages, then the loss is $20\log(V_{out}/V_{in})$ dB,
> assuming that the ports have the same impedance. There's no such
> thing as "voltage loss" expressed in dB.

Yes yes yes. I thought I had it incorrectly calculated at $10\log$, but that wasn't the case.

> And wouldn't a CATV widget be 75 ohms, not 50?

Yes. Impedance bump indeed, but tell that to the early Wavelan designers! We had a rep from Lucent at our wireless networking show last october and he as well as the rep from DEC assured me that the output impedance of the Wavelans and Roamabouts is and has always been 50 ohms (even though they used lossy 75 ohm connectors in the early models).

There is also a 2-3 mm. space between the PCB and the F connector on these cards. I can only guess at how much power gets radiated by this gap.

I have searched long and hard to try to replace these crummy F connectors with BNC's, but none of the connectors I found came even close in terms of pin spacing/size.

Bernie

26. FreeWave Deal?

From: Jim Jefferson <cjeffers@luminet.net>
Date: Sun, 06 Apr 1997 19:26:38 -0500
To: ss@tapr.org
Message-ID: <1.5.4.32.19970407002638.0069cb88@luminet.net>
Rendered body type: text/plain

Did the freewave deal fall through?

-Jim Jefferson KB0THN
cjeffers@luminet.net
<http://www.luminet.net/~cjeffers/>

27. Re: [SS:1248] FreeWave Deal?

From: Tony McConnell <n3jly@erols.com>
Date: Mon, 7 Apr 1997 00:05:14 -0400
To: ss@tapr.org
Message-ID: <199704070405.AAA29046@smtp1.erols.com>
Rendered body type: text/plain

yes Jim, it did.

At 07:33 PM 4/6/97 -0500, you wrote:
>Did the freewave deal fall through?
>
>-Jim Jefferson KB0THN
>cjeffers@luminet.net
><http://www.luminet.net/~cjeffers/>
>
>
>

28. Re: [SS:1204] Re: SS:938 & SS:960

From: fmcnally@market1.com (Frank McNally)
Date: Tue, 8 Apr 1997 20:55:28 -0600
To: ss@tapr.org
Cc: pconner@market1.com
Message-ID: <3.0.16.19970408205308.4fef1c08@market1.com>
Rendered body type: text/plain

I do not understand why there has not been more interest by the TAPR group in Randy's offer. I have investigated his page and find it to be very interesting. As a group, we are looking to learn and build SS boxes for ourselves. I believe this is a perfect opportunity for all of us. I hope we are not missing the boat on this one.

At 08:17 AM 3/20/97 -0600, you wrote:
>Here's a little more ACTION for the SS adventuresome out there in TAPR-land:
>
>I have posted schematics, PCB files & basic 16C64 microprocessor code up on
>my site for some of the SST-1 radio-modem -- for your viewing and
>downloading pleasure!
>
>Take a look at: <http://sss-mag.com/whatsnew/nuissue.html#3>
>
>A BARE PCB for the "Baseband" section of the SST-1 will be available soon at
>US\$39 each -- see above link for more info.
>
>BTW, this project was originally dubbed the "VAPOR1" as a play on words --
>it has now become the SST-1, but some of the files still have vapor'ish
>names :-)
>
>73 for now,
>
>Randy, KC6YJY
>
>
>
>

29. Re: [SS:1250] Re: SS:938 & SS:960

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Tue, 8 Apr 1997 22:45:47 -0500
To: ss@tapr.org
Message-ID: <v030209ceaf70bf785e0b@[208.134.134.40]>
Rendered body type: text/plain

Hi Frank.

As I followed up with -- who is willing to take the time and energy to take the proposal and make it into a TAPR project/kit for the members ? If all this is ready to go, then TAPR probably doesn't need to be doing it, but PacComm or someone else should think about doing commercially and making it available.

See my messages posted right after Randy's. I don't have the time currently to bird dog the project (numerous issue and hours of work) to making the thing into something that many can access. I have three TAPR projects I am trying to get closure on before Dayton and a dissertation which my Prof is bleeding (in green ink) all over each time she reads it.

Who does ? If someone does and is willing to make the commitment to do it, I am more than willing to ask the TAPR board to support someone(s) proposal for doing it within TAPR.

I had one comment, but no comments or commitment for someone(s) to do anything with the proposal.

Looking forward to maybe someone stepping forward and taking this on ?

Cheers -- Greg

>I do not understand why there has not been more interest by the TAPR group
>in Randy's offer. I have investigated his page and find it to be very
>interesting. As a group, we are looking to learn and build SS boxes for
>ourselves. I believe this is a perfect opportunity for all of us. I hope
>we are not missing the boat on this one.
>
>At 08:17 AM 3/20/97 -0600, you wrote:
>>Here's a little more ACTION for the SS adventuresome out there in TAPR-land:
>>
>>I have posted schematics, PCB files & basic 16C64 microprocessor code up on
>>my site for some of the SST-1 radio-modem -- for your viewing and
>>downloading pleasure!
>>
>>Take a look at: <http://sss-mag.com/whatsnew/nuissue.html#3>
>>
>>A BARE PCB for the "Baseband" section of the SST-1 will be available soon at
>>US\$39 each -- see above link for more info.
>>
>>BTW, this project was originally dubbed the "VAPOR1" as a play on words --
>>it has now become the SST-1, but some of the files still have vapor'ish
>>names :-)
>>
>>73 for now,
>>
>>Randy, KC6YJY
>>
>>
>>
>>

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

30. Re: [SS:1250] Re: SS:938 & SS:960

From: Tony McConnell <n3jly@erols.com>
Date: Wed, 9 Apr 1997 01:08:47 -0400
To: ss@tapr.org
Cc: frussle@erols.com
Message-ID: <199704090508.BAA09519@smtp3.erols.com>
Rendered body type: text/plain

At 09:54 PM 4/8/97 -0500, you wrote:
>I do not understand why there has not been more interest by the TAPR group
>in Randy's offer. I have investigated his page and find it to be very
>interesting. As a group, we are looking to learn and build SS boxes for
>ourselves. I believe this is a perfect opportunity for all of us. I hope
>we are not missing the boat on this one.

Frank, I do understand how you feel about Randy's offer. It sounds interesting.

I can't speak for TAPR, BUT... my view of the matter is... Randy has offered his design, royalty free, ON A TEMPORARY BASIS. Please understand, I find this a resonable offer, but one with a catch. Can TAPR encourage us all to go forward with a system/format/design that is not going to be in the public domain in the future? The system as Randy described it would deserve consideration. The idea of transmit and receive IFs that would then be transverted to the band of interest is a good idea.

There are other ways to design an SS system that is band independant.

We have a wonderful oportunity to use Amatuer Radio the way that it has been used in the (unfortunately distant) past. EXPERIMENT!!! Like they say in my daughters favorite tv show "go out there take chances, get messy, Learn something!"

I hope that the readers of this SIG as a group are the ones that see the promise of spread spectrum. Not all of us here know which end of a soldering iron is the

safe one to grab but....

We can't wait for anyone to hand us the answers. Not Randy. Not Qualcomm. Not Harris.
Not Motorola/Loral/Freewave et al.... other than Randy I know that whole list would like nothing better than to keep us out of 'their' precious spectrum.
Where we are 'primary' but they are the only ones there.

I truly hope there are other people out there studying ss. It's not magic!
If you really understand how a ssb transmitter does what it does, you can understand how DS ss could work. If you could picture changing the freq really fast on your HT while you transmitted and your friend across town changed his to receive you, that is how FH ss works. Any technique advanced enough looks like magic, but isn't.

This is a great opportunity, don't wait for Kenwood to bring it to you.

.... I'll now quietly climb off my soapbox.

DE N3JLI

31. Software for calculate microwave/RF links

From: Kleber Almeida <kleber@magiclink.com.br>
Date: Wed, 09 Apr 1997 03:54:06 -0300
To: ss@tapr.org
Message-ID: <334B3D0E.5A3D@magiclink.com.br>
Rendered body type: text/plain
Hello...

Where i acquire softwares (shareware or not) in the Internet for calculate radio links ?
Thank's a lot !!!

32. Response to SS:938 & SS:960

From: RLANIER@mailb.harris.com (RLANIER)
Date: Wed, 9 Apr 1997 09:09:10 -0400
To: ss@tapr.org
Message-ID: <34b94f70@mailb.harris.com>
Rendered body type: text/plain

I would like to respond to the responses to these threads on the TAPR SS list ...

I am quite fed up with everyone talking about what we should do concerning designing and building a spread spectrum system. I have seen numerous times how this list breaks down to discussions about SSTV or RS-422 vs. Ethernet.

I submitted a conceptual systems-level design (remember top-down design?) and heard from ONE person! Everyone wants to grip about the details, but will not discuss the overall system and how everything will fit together.

I realize most people are very busy (I work 40+ hrs and take engineering courses at the local university), but if this thing is to get off the ground, we have to AGREE on WHAT to DO!!!!

Personally, I think what Randy has to offer is the best way to go. Why? Because using his work as a foundation, we can design a system around his work which will be practical, educational and FUN! I have abandoned the chipset idea in favor of a modular system, where the individual sections of the system are composed of discreet parts. We can learn a great deal more designing and building this way. Similar to an academic design, except this one will work!

Are we going to work together or not?

Tony KE4ATO

33. Re: [SS:1253] Software for calculate microwave/RF links

From: Randy Roberts <randyrf@sss-mag.com>
Date: Wed, 9 Apr 1997 06:50:09 -0700 (PDT)
To: ss@tapr.org

Message-ID: <2.2.16.19970209054810.2ad79aca@sss-mag.com>
Rendered body type: text/plain

Dear Kleber & other SS SIG'ers:

There is a lot of this sort of shareware available on my home page(s) --
take a look at:

http://sss-mag.com/prop.html
http://sss-mag.com/swindex.html
http://sss-mag.com/eestuff.html
and finally http://sss-mag.com/rfstuff.html

Enjoy the downloads & feel free to explore our site with nearly 200 pages of
useful html info on RF, SS and electronic engineering / Ham stuff!

73 de KC6YJY, Randy Roberts

At 01:57 AM 4/9/97 -0500, you wrote:

>Hello...

>

> Where i acquire softwares (shareware or not) in the Internet for
> calculate radio links ?

> Thank's a lot !!!

>

>

34. Re: [SS:1251] Re: SS:938 & SS:960

From: Randy Roberts <randyrf@sss-mag.com>
Date: Wed, 9 Apr 1997 07:19:46 -0700 (PDT)
To: ss@tapr.org
Message-ID: <2.2.16.19970209061746.2ad7ff00@sss-mag.com>
Rendered body type: text/plain

Hi Greg, Frank, et al:

I've been following this SIG for several months now & I'm convinced that
MOST of the postings here are almost QRM! But this latest message deserves
some comment -- so here goes.

First, Greg is absolutely correct -- turning the SST-1 into a viable,
producible design will take a LOT of HARD WORK!

Second, I think Greg is dead wrong about the commercial viability of ANY SS
design for Hams! Both Icom & Kenwood have been longtime subscribers to the
(old) printed version of SSS -- have you seen anything SS from them yet?
You probably won't either, for a good length of time. I think all
breakthroughs in Ham Radio's history have been done with non-commercial
first intentions -- e.g. SSB, TAPR-1 packet radio, eme, etc.

Third, if the initially proposed 3 year free license is too short -- I'll be
glad to extend it to 5 or 7 years -- but, today's IC(ASIC & MMIC)-based
equipment is usually obsolete in 3 or 4 years anyway -- just like your 3
year old 486-33 PC.

Four, Band independent SS - huh? Well it is possible to do just that with
some fairly simple Freq. Hopper designs -- all you need is the baseband
circuitry to hop a PLL synthesizer for the TX and RX LO and FSK (or GMSK or
MSK or ???) modulate it. The rest of the RX is also quite frequency
independent -- all you need is a good IF / demodulator and Freq. Hop. / sync
circuitry! I DON'T think any DS implementation is band independent, however!

My general approach and thinking with the SST-1 was to provide for BOTH DS
AND FH -- the only practical way to do this is with a COMMON baseband / IF
unit attached to band specific "transverters."

Finally, REMEMBER that the ONLY SS Chipset now available with a SECOND
SOURCE is the STEL-2000A / Zilog Z87200 !!! Wonder why I picked it?

This chipset provides up to 18 dB processing gain AND uses a Fast parallel
correlator -- this makes FH sync easy, quick & practical -- along with
providing very fast acquisition for DSSS.

BTW, I have received quite a few nice comments on this design as well as
other offers of various kinds of help from around the world -- just maybe,
TAPR should think about teaming up with one or more other international
groups to undertake a Ham SS project like the SST-1!!!

Let's see some thought out, on track (or SS pertinent) postings here! Any comments / questions / suggestions or requests?

73 de KC6YJY, Randy

At 11:13 PM 4/8/97 -0500, you wrote:
>Hi Frank.
>
>As I followed up with -- who is willing to take the time and energy to take
>the proposal and make it into a TAPR project/kit for the members ? If all
>this is ready to go, then TAPR probably doesn't need to be doing it, but
>PacComm or someone else should think about doing commercially and making it
>available.
>
> . . .
>
>Cheers -- Greg
>
>>I do not understand why there has not been more interest by the TAPR group
>>in Randy's offer. I have investigated his page and find it to be very
>>interesting. . .
>>
>>At 08:17 AM 3/20/97 -0600, you wrote:
>>>Here's a little more ACTION for the SS adventuresome out there in TAPR-land:
>>>
>>>I have posted schematics, PCB files & basic 16C64 microprocessor code up on
>>>my site for some of the SST-1 radio-modem -- for your viewing and
>>>downloading pleasure!
>>>
>>>Take a look at: <http://sss-mag.com/whatsnew/nuissue.html#3>
>>>
>>> . . .
>>>
>>
>
>
>-----
>Greg Jones, WD5IVD
>Austin, Texas
>wd5ivd@tapr.org
><http://www.tapr.org/~wd5ivd>
>-----

35. Re: [SS:1256] Re: SS:938 & SS:960

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Wed, 9 Apr 1997 10:48:33 -0500
To: ss@tapr.org
Message-ID: <v03020913af7164dd97d0@[208.134.134.40]>
Rendered body type: text/plain

>Hi Greg, Frank, et all:
>
>I've been following this SIG for several months now & I'm convinced that
>MOST of the postings here are almost QRM! But this latest message deserves
>some comment -- so here goes.
>
>First, Greg is absolutely correct -- turning the SST-1 into a viable,
>producibile design will take a LOT of HARD WORK!

There are two projects and probably more with people doing things -- I feel that we will see stuff start to appear in 8-12 months or more as things go down paths. We have to remember that the amateur development hobby cycle is much slower then commercial development. The real push on stuff has started, because of the emphasis placed on development just in the last 12-14 months.

I just read Tony's post and can understand his side of things as well, but success requires at least four items:

1. people
2. critical mass of people with certain skills
3. time
4. and money

Most of the time to get things done, you have to generate at least 3 of those 4 items yourself. Waiting around and discussing doesn't make it happen. All projects in TAPR happen because someone jumps in and has a desire to see something completed. There is always one person that has to take the point and see something through or fall in -- and even then

sometime a project can fail. This is one reason we see some of the same people show up over the years. Once you have done a project, you understand what is required and subsequent projects are easier in some ways. Plus, whatever made the first project successful is probably still in place for later attempts.

If someone has a concept for something, getting on this list and discussing it is good, but as I stated over on the HF SIG a week or so ago, will most likely not result in getting anything done. These lists provide good interchange, but have yet to spawn a project. Maybe someone will show me I am wrong and be able to do something. What I typically see is that a discussion on the list generates some small group to then go off and do something and then bring it back to the group at some later time.

>Second, I think Greg is dead wrong about the commercial viability of ANY SS design for Hams! Both Icom & Kenwood have been longtime subscribers to the >(old) printed version of SSS -- have you seen anything SS from them yet? >You probably won't either, for a good length of time. I think all >breakthroughs in Ham Radio's history have been done with non-commercial >first intentions -- e.g. SSB, TAPR-1 packet radio, eme, etc.

This is not what I said. Icom and Kenwood don't make amateur radio equipment. They make commercial equipment, that just happens to have a secondary market in amateur radio sales in the US.

However, PacComm and several other commercial companies are in a position now to do something with a design that is ready to go. What I said was that it might not make sense for TAPR to do something on a design if it is advanced enough for someone like PacComm to make a finished package for the amateur radio community. Having a built and tested unit for amateur radio experimenters is going to be much more successful in terms of number of people playing than having a component level kit or semi-kit.

Any type of SS system (RF) is going to have to be much more than just a kit. We probably have about 25% of members within TAPR capable of building and getting fully operational a RF based kit. Thus, a semi-kit with the RF already built and tested has to be seriously examined. Again, maybe I am wrong -- and I hope I am -- that a greater percentage of the membership is in a position to really build RF stuff from component level at 900Mhz or 2.4G.

>BTW, I have received quite a few nice comments on this design as well as >other offers of various kinds of help from around the world -- just maybe, >TAPR should think about teaming up with one or more other international >groups to undertake a Ham SS project like the SST-1!!!

If someone shows up with a proposal that can then be reviewed, then we have something. There are two projects that will be approaching TAPR in the next month or so for review and possible funding and hopefully we can look at taking on one or both -- but you never know until you see the details and can discuss outcomes with the participants.

>Let's see some thought out, on track (or SS pertinent) postings here! Any >comments / questions / suggestions or requests?

This would be really welcomed. But this type of stuff doesn't get done by committee. We all have very differing thoughts on design and concept. Just look at the debate of Ethernet vs serial, or some of the others that have happened on the list. That is a weakness of this type of communications, but then again that is the strength as well. The cross-pollination of information and contacts that get many things further along and people thinking and examining their beliefs and reasons for what they had in mind.

Just a few personal comments.

Greg, WD5IVD

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

36. Re: [SS:1253] Software for calculate microwave/RF links

From: "P.A.Sadowski" <sadowski@bellatlantic.net>
Date: Wed, 09 Apr 1997 10:18:41 -0400
To: ss@tapr.org
Message-ID: <334BA541.4323@bellatlantic.net>
Rendered body type: text/plain

I assume Kleber Almeida was interested in link margin calculations? I too am interested in said software - but I'd like it to have "Fresnel Zone" and edge diffraction aspects figured in.... as well as have the answer give me some feedback concerning weather (rain/snow) fading at the freq of interest - and ice accretion loss info (have I asked for everything yet ha ha.)

I'd even be willing to attempt the code myself if there were the full set of algorithms available online....

I found some great commercial software for this function.... which used antenna gains... hts above terrain, tx power... terrain, freq etc... but I couldn't afford either commercial package and the terrain data I have (DTED) wasn't an input option anyway (though I believe I could convert DTED into the mesh data structure needed by the commercial software... back to the \$\$\$ problem)....

TNX in advance...

AH6LS
Al

Kleber Almeida wrote:
>
> Hello...
>
> Where i acquire softwares (shareware or not) in the Internet for
> calculate radio links ?
> Thank's a lot !!!

37. Re: [SS:1254] Response to SS:938 & SS:960

From: "P.A.Sadowski" <sadowski@bellatlantic.net>
Date: Wed, 09 Apr 1997 15:58:25 -0400
To: ss@tapr.org
Message-ID: <334BF4E1.6E37@bellatlantic.net>
Rendered body type: text/plain

RLANIER wrote:
>
> I would like to respond to the responses to these threads on the TAPR
> SS list ...
>
> I am quite fed up with everyone talking about what we should do
> concerning designing and building a spread spectrum system. I have
> seen numerous times how this list breaks down to discussions about
> SSTV or RS-422 vs. Ethernet.
>
> I submitted a conceptual systems-level design (remember top-down
> design?) and heard from ONE person! Everyone wants to grip about the
> details, but will not discuss the overall system and how everything
> will fit together.
>
> I realize most people are very busy (I work 40+ hrs and take
> engineering courses at the local university), but if this thing is to
> get off the ground, we have to AGREE on WHAT to DO!!!!
>
> Personally, I think what Randy has to offer is the best way to go.
> Why? Because using his work as a foundation, we can design a system
> around his work which will practical, educational and FUN! I have
> abandoned the chipset idea in favor of a modular system, where the
Tony

If Randy doesn't require the full blessing of TAPR... maybe "we" just needs to be a group that wants to go ahead and start.... It's not like two different directions (or more) are unheard of within TAPR... example the DSP-93... the Motorola EVM.... and the DSP soundcard effort....

Just a comment... but if a "sub-group" is allowed to go forward with Randy's design.... well at least I can learn from it... count me in.

Al
AH6LS

> individual sections of the system are composed of discreet parts. We

> can learn a great deal more designing and building this way. Similar
> to an academic design, except this one will work!
>
> Are we going to work together or not?
>
>
> Tony KE4ATO

38. Re: SS:938 & SS:960

From: Randy Roberts <randyrf@sss-mag.com>
Date: Sun, 13 Apr 1997 10:33:14 -0700 (PDT)
To: ss@tapr.org
Message-ID: <2.2.16.19970213093114.4bffc6a6@sss-mag.com>
Rendered body type: text/plain

QST All You SS Fans out there in SS SIG -land:

Please take a look at yet another set of ideas and design concepts for the
"ultimate" Ham Radio SS Rig, at:

<http://sss-mag.com/sst.html>

Comments, criticisms and even conflicting ideas are welcomed!!!

73 de KC6YJY -- Randy Roberts

39. MY DRAFT Comments on FCC Spread Spectrum Rulemaking

From: "Steven R. Bible" <sr bible@gnatnet.net>
Date: Sun, 13 Apr 1997 18:48:38 -0400
To: ss@tapr.org
Message-ID: <1.5.4.32.19970413224838.00665800@gnatnet.net>
Rendered body type: text/plain

Originally posted to vhf@w6yx.stanford.edu and amsat-bb@amsat.org

To: VHFers of the U.S.
From: Bill Tynan W3XO
Subject: DRAFT of My Proposed Comments on FCC Spread Spectrum Rulemaking

Comments on FCC's Notice of Proposed Rulemaking on spread spectrum are due
May 5.

A copy of the NPRM is available on the TAPR Web page. I am posting a DRAFT of
the comments I expect to file for anyone who wants to use them in forming their
own comments. You may not agree with everything I say, maybe none of it.
Nevertheless, everyone seriously interested in the bands above 50 MHz should
get
comments in by the May 5 date (An original and 4 copies are required). Please
do not merely copy my comments. Many comments, all the same, will not carry
much weight with the Commission. So, base your comments on mine or don't, but
comment.

BTW, don't conclude that because the FCC NPRM call only for SS above 420 MHz,
that the final rules will limit it to these higher frequencies. Many SS
proponents will argue that it should be authorized on ALL frequencies above 50
MHz. That is what is allowed in the TAPR STA currently in force.

While you are reviewing my comments, if you see any technical, or factual
difficulties with them, please let me know as soon as possible. My E-Mail
address is biltynan@kctc.com (Note: only one l in bil)

73,

Bill

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Amateur Service	)	
Rules to Provide For Greater	)	WT Docket No.97-12
the Amateur Radio Service to	)	
Use of Spread Spectrum	)	
Communication Technologies	)	

To: The Commission

COMMENTS OF WILLIAM A. TYNAN W3XO

Background

I have been a licensed amateur since 1945, obtaining the call sign W3KMV early 1946. I upgraded to Class A (later called Advanced) in the fall of 1946 and to Extra in the early 1970s. I obtained my present call sign, W3XO in 1976. Throughout those 50 years, my principal interest has been in the bands above 50 MHz. I am currently operational on all bands from 50 to 1296 MHz. For 18 years, from 1975 through 1992, I served as a Contributing Editor of QST Magazine, responsible for the monthly column "The World Above 50 MHz". I was one of the founders of the Radio Amateur Satellite Corporation (AMSAT) and have been serving as its President since late 1991.

Introduction

I filed reply comments on the proposed liberalization of amateur SS rules as contained in RM-8737 and have reviewed the comments of many of those who took part in that proceeding on both sides. In this document, I will draw on these comments and cite specific references where appropriate. I will also review and update my own comments in that proceeding with information that has come to light since that time; and make specific recommendations based on that information and my own knowledge.

Summary

I generally support the intent of the Commission's proposed Rule Making contained in this Proceeding - namely liberalizing the rules governing the use of Spread Spectrum (SS) in the Amateur Service. I have always wholeheartedly supported the development of new technologies in and for the Amateur Service and Amateur-satellite Service. I believe that SS may represent a significant vehicle for facilitating improved communication between licensed amateurs, both terrestrially and through amateur satellites. I further believe that the Commission's rules should provide the maximum degree of flexibility for accomplishing this objective, consistent with preserving the viability of current communications capabilities, especially including those associated with various kinds of "weak signal" work, including that through amateur satellites. I contend, that, to promote the development of a variety of SS techniques and not materially impact existing amateur activities, certain provisions must be included in any rules which the Commission may adopt. My views with respect to such provisions will be outlined in these comments, along with supporting technical justification for them.

In addition, I believe that, to maximize the flexibility for developing SS techniques for uses other than its apparent advantages in local communication applications, two classes of SS should be defined by the Commission and implemented in any new rules. These will be defined and certain frequency bands suggested for each type.

Discussion

While SS promises a great deal of benefit of improving amateur and amateur satellite communication, I contend that its unbridled authorization and widespread use, particularly in a wide bandwidth embodiment, has the potential of rendering current techniques, as practiced on the VHF and UHF Amateur bands unusable. As part of their argument that SS offers little or no interference to other modes, SS proponents cite only occasional short lived signals on a specific channel as characteristic of SS interference to other modes.(1), (2) While I acknowledge that this interference scenario may be valid for the case of a single SS station, or even a few such stations; I contend that it is a unrealistic if SS becomes as popular a mode as its proponents obviously hope it will. If that comes to pass, the short bursts of interference referred to in the References, will be repeated by each SS station on the air at the time. If there are, for example one-hundred SS stations on the air in a major metropolitan area, these short bursts of interference will be repeated one-hundred times as often as in the case of a single SS station. Thus, SS interference to other modes could eventually take the form of a continuous "buzz". As AMSAT and I pointed out (3), SS operation has the potential for raising the noise floor by 50 dB (a factor of

TEN-THOUSAND) or more. Some might contend that the potential for having 100 stations operating in an area at a time is small. I contend that this is not necessarily true. A scenario can be envisioned which calls for continuous 24 per day operation of SS stations. Such operation is already present in commercial applications of SS techniques. One example is the Internet connectivity offered by Metricom. Many, who use this service leave their computers and radio transceivers on all the time connected to the Internet through the system. Thus, even when they are not actively using the connection their transceivers are continuously exchanging signals with the local site. While I do not share that view, there is a growing number of licensed amateurs today who feel that inexpensive Internet access should be one of the major "purposes" for Amateur Radio. If such activity gains favor, it is easy to envision local amateur SS links being up continuously, connected to a central station which is connected to the Internet. Even if Internet connectivity does not become a common use for Amateur Radio, various other amateur-only applications such as DX clusters are likely to employ SS and be active continuously. Many amateurs today maintain constant connection with DX clusters via AX-25 packet radio links.

Various reply comments were submitted on RM-8737 stating that AMSAT's calculations on the potential increase in noise floor are wrong. Two claims were made to refute these numbers. One was that the power was in excess of might be expected under "real-world" amateur SS operation. The power level used, is that currently authorized by the Commission for amateur SS operation and the level proposed to be continued by the NPRM. The use of any other scenario would represent sheer "guesswork". Nevertheless, even if one were to reduce the power by a factor of one-hundred (to the 1 Watt level), the increase in noise floor would still be 30 dB (a factor of ONE-THOUSAND). The other complaint with the AMSAT approach, was the use of free-space attenuation. I submit that anything other than free-space is unrealistic. While other attenuation models may be applicable to cellular telephone applications and other small terminals located in urban environments, such models are not applicable when applied to "weak signal" amateur stations which characteristically have antennas as high as possible and are generally not located amongst tall buildings.

A number of SS proponents participating in RM-8737 made claims that ten years of SS authorization have produced little or no complaints of interference to other modes. I contend that this claim cannot be substantiated for two reasons, the most compelling is that even those proposing further liberalization of SS rules, admit that there has been an extremely small number of amateurs using SS during this period. In addition, there seems to have been a concerted effort to "hide" any operation that did take place. To my knowledge, there have been no tests conducted by SS operators in which non-SS operators were invited to take part. Indeed, I know of at least one prominent weak signal VHF operator in a large West Coast metropolitan area who has repeatedly requested that tests be conducted by SS equipped stations so that he could assess possible interference.

All such requests were met with indifference, and even hostility on the part of the SS operators. And no such tests were ever conducted. Another indication of the lack of testing during this over-ten-year period, is the fact that no reports of any such testing has ever been published in magazines of general amateur circulation. I am unaware of any reports published even in specialty periodicals. So, claims that SS will not affect current amateur operation are completely unsubstantiated. Maybe it won't and maybe it will. But, nothing has been proven one way or the other.

Contained within the Commission's NPRM is an indication that some apparently informed people believe that SS does represent a threat, even to other SS operation. The NPRM notes that Metricom has urged the Commission to limit amateur SS power in the 900 MHz and 2400 MHz bands to the same levels presently authorized for them and other Part 15 users. While I believe that the Commission should reject any such proposal (an unlicensed service claiming that a licensed service should be limited to the same power restrictions as they), I believe the Metricom statement does indicate that SS may not be as immune to interference, or as unlikely to cause interference, as claimed by the SS advocates.

Automatic Power Control

The Commission's proposed rule making includes a provision for automatic power control for SS stations running more than 1 Watt. While I support the apparent

intent of the proposed rule, to minimize the impact of SS on other types of operation, I contend that automatic power control will not work in the Amateur Service or the Amateur-satellite Service. In fact, I believe that it is prima facie evidence that, even the Commission, believes that SS operation poses an interference threat to other modes. I further contend that requiring the use of automatic power control will have minimal effect on the impact of SS on other modes. As part of my rationale for concluding that automatic power control is unworkable, I cite the comments of several SS proponents. (4), (5), (6)

I believe that there are two principal problems with automatic power control. It may be applicable to terrestrial point-to-point (one-on-one) scenarios, such as encountered in cellular telephony. In this mode the two stations may be able to exchange information on their signal levels and enable the adjustment of transmitter power to achieve acceptable levels. In digital SS systems such as are apparently being envisioned for Amateur Radio, a particular value of E_b/N_0 would be established and power regulated to achieve it. But, if the communication is from one station to a number of listening stations ("bulletin mode"), as is often the case in amateur communication, rather than one-on-one, this scheme breaks down no matter how it is implemented. Even in the "one-on-one" situation, mandating automatic power control requires a higher degree of equipment standardization than is typical of amateurs. It may even require that all stations participating in the power adjustment process to have equipment from a single manufacturer.

Automatic power control also has two obvious problems when used through amateur satellites:

1. Satellite signals often fade, fairly rapidly over quite wide margins due to satellite attitude changes and/or ionospheric effects. At least for high altitude satellites, the delay time between stations can be on the order of 1/4 second. Thus, information on power adjustment may take that long to reach the other station and be acted upon. With fading, this time delay may be enough to render the power control "loop" unstable. (It will always be "hunting" for the appropriate power level, and end up calling for more power when less is required and less when more is needed.)
2. In amateur satellite work, it is good practice for the various users to listen to the satellite downlink signals prior to transmitting. With automatic power control, some participants may not have stations as well equipped as others. A station, not so well equipped, may not be able to hear many signals if the powers of many of the stations operating have been adjusted down to communicate with better equipped stations. The not so-well-equipped stations may be new people just getting started in amateur satellites. The chances of them becoming discouraged when they encounter little activity, is quite high.

In addition the specific problems associated with amateur satellite operation, I contend that mandating automatic power control is inconsistent with the objective of making amateur SS rules as flexible as possible. In fact, any such requirement seems to represent the height of inflexibility. It is interesting to note that many of the proponents of SS have made a similar comment. One such comment, already noted, was made by the Navy Post Graduate School.

A Proposed Approach for Peaceful Development of SS in the Amateur Service

How can the development of SS techniques be encouraged and still prevent potential serious harm being caused to existing modes and the inevitable bad feelings that can result from such harm? I contend that the solution to this dilemma lies in the establishment, in any Rules which the Commission may invoke, of provisions proscribing certain frequency segments for SS operation. In addition, in order to take advantage of the potential capability of SS techniques for long-haul weak signal work, I propose that a narrow band version

of SS be defined and authorized. I believe that it should be able to be used more generally throughout the spectrum than the "wideband" version apparently be proposed in the NPRM.

Two Kinds of SS

The case for the potential utility of a narrowband version of SS was made in a paper presented at the Central States VHF Conference held in Minneapolis in July 1996. Tom Clark W3IWI and Phil Karn KA9Q outlined a possible use of SS techniques for enhancing weak signal communication such as Earth-Moon-Earth or long haul terrestrial. Their presentation convinced me that this application of SS should be accommodated in any new rules which the Commission may adopt. I feel that accomplish this, while not allowing SS operation to materially impact other operation, the Commission should define two types of SS. One type might be called "Broad Band" and the other "Narrow Band". From what I understand, it is the "Broad Band" type of SS that is proposed by those advocating liberalization of SS rules and that the Commission is addressing in this proceeding. Its bandwidth is generally undefined but is certainly wider than conventional modes such as voice FM, AM and SSB. As noted, the "Narrow Band" type of SS might be potentially be very beneficial to weak signal modes, including work through amateur satellites and Earth-Moon-Earth (EME).

MY Proposal

In light of the above, I propose that a "Narrow Band" version of SS be authorized on all of the bands above 50 MHz so long as the bandwidth of the transmitted signal does not exceed that already authorized on these bands. In my opinion, it should also be permitted for use as satellite downlinks in the 10 meter band. .

I further propose that the "Broad Band" version of SS should be authorized only in the following segments:

- 219 - 220 MHz
- 435 - 438 MHz*
- 902 - 928 MHz
- 1240 - 1290 MHz**
- 2390 - 2450 MHz
- All Amateur frequencies above 3300 MHz

* In the segment 435 -438 MHz, SS emissions should be confined to that 3 MHz segment and, except for short tests to confirm proper operation of equipment, should only be for the purpose of working through amateur satellites.

** In the segment 1260 - 1270 MHz all SS emissions, except for short tests to confirm proper operation of equipment, should only be for the purpose of working through amateur satellites.

While there is weak signal experimentation occurring around 3456 MHz, 5760 MHz, 10368 MHz and at specific frequencies in the higher microwave bands, I have become convinced that amateur SS operation poses little threat to these activities. The principal reason for reaching this conclusion, is the power levels that might be expected to be used in these bands and the effect antenna directivity that is characteristically involved, will materially reduce the probability of interference between SS and other modes.

Conclusion

I believe that SS operation should be encouraged. I further believe that it may well eventually prove valuable for both terrestrial, amateur satellite and EME work. However, I contend that terrestrial SS operation should not be allowed to interfere with existing amateur and amateur satellite operation. I contend that this is consistent with existing Commission policy in the Amateur Service, and cite, as examples, the fact that voice operation has been limited to certain segments in the HF and VHF amateur bands for many years. In addition, unattended digital operation is restricted to certain small segments of the HF bands and Unattended Beacon Operation is allowed only in small segments of the

10 meter, 6 meter, 2 meter, 1-1/4 meter and 70 cm bands.

I recommend that the Commission incorporate these suggestions in formulating new rules designed to foster widespread use of SS among amateur radio operators. I further recommend that the Commission place no greater restrictions on SS use, such as station identification and authorized spreading codes, than it feels is absolutely necessary, and that automatic power control not be required. I contend that such a course will foster growth of SS among amateurs, including those using it in connection with extended range weak signal communication as well as through amateur satellites. In addition I propose that the Commission authorize two types of SS. One that could be termed "Narrow Band" would be authorized anywhere above 50 MHz, as well as a downlink in the 10 Meter Amateur-satellite Service allocation; as long as the transmitted bandwidth does not exceed that already authorized in the particular segment. The other, that could be called "Broad Band", would be authorized anywhere in the segments listed above, with the limitations stated. I believe that this course will allow amateurs to develop SS technology and continue in their historic pursuit of all new technologies as well as their march to higher and higher frequencies. At the same time other valuable amateur operation will be preserved..

RESPECTFULLY SUBMITTED,

By _____
William A. Tynan W3XO

May __, 1997

Mailing Address:
HCR5 Box 574-336
Kerrville, TX 78028

E-Mail: biltynan@kctc.com

Notes:

1. Reply Comments of Charles M. (Marty) Albert Jr. KC6UFM
Paragraph entitled "Additional General Comments. Mr. Albert says in part
"Using
the 10 millisecond dwell time cited by Buaas, this means that you will miss
only
ONE-FIFTH of ONE WORD sent. If we assume that the voice transmission lasts 5
minutes and the SS makes a "hit" as often possible...."
2. Reply Comments of Robert A. Buaas, K6KGS 20271 Bancroft Circle
Huntington
Beach, CA 92646. Mr. Buaas postulates a the following scenario: (His paragraph
numbers are included for ease of reference.)

(3a)"Use Voice modulation type F3E(conventional NBFM):

(3b) Use only Frequency Hopping of the carrier frequency to accomplish the SS
function:

(3c) Operate within the 450 MHZ repeater spectrum and conventions: receive
within the 5 MHZ allocated for repeater receivers and transmit within the 5 MHZ
allocated for repeater transmitters: use carrier frequencies aligned with those
of current repeaters: this provides 200 discrete receiver and transmitter
operating frequencies, each of width 25 Khz (Choosing 20 Khz bandwidths
provides
an additional 50 hopping channels: this my eventually be operationally
desirable, but for the purpose of this model it only complicates the arithmetic
for interference assessment. It does not significantly alter the impact of or
nature of signal collision):

(3d) Dwell on each channel for exactly 10 milliseconds, then hop:

(3e) Choose a hopping function which:
(3e1) uses every available channel before any reuse. We will call the total
time required to use all the channels the "period" of the hopping function
(taking (3c) and (3d) together, it is 200- milliseconds) and,

(3e2) during one period, selects channels for each use such that the time since

the same channels use in the previous period is statistically random:"
"With the system parameters give above, interference impact evaluation is very straightforward. Parameter 3d is chosen so that SS activity does not activate the noise squelch of NBFM receivers. When the FHSS arrives on an active repeater channel, FM capture rules apply. In the case where the SS station captures the other user, the capture lasts 10 milliseconds in 2000, or for 0.5% of the transmission. This impact is so slight as to be neglected in real operations."

3. AMSAT said in its Reply Comments, "To obtain a measure of the possible interference that could result from only a single spread spectrum station, the following parameters are assumed:

Spread spectrum station with an effective power of 100 W ERP =
+20 dBW (The power specified in the Docket)
If spread over 10 MHz -50 dBW/Hz
Free-space attenuation at 20 km from the spread spectrum
station at 432 MHz = -110 dB
Spread spectrum signal at 20 km = -160 dBW/Hz

A receiver with a 1 dB NF (common in satellite & weak signal work) = -210 dBW/Hz

So the spread spectrum signal could be as much as 50 dB above the noise floor that would exist without it.

One can use these calculations to cite other scenarios:

For example, if the spread spectrum station had a power of only 1 W ERP, this is 20 dB less, yet the noise floor would still be as much as 30 dB higher because of its presence. Similar calculations for other distances can also be done. For example, the spread spectrum signal would be 20 dB stronger at a 2 km distance. As another example, a 100 W transmitter and 10 dB gain antenna could create 10 dB more interference. Obviously, if the spread spectrum station is in close proximity to the satellite or terrestrial weak signal station, the degradation from the spread spectrum station's operation would be much greater."

4. Reply Comments submitted by the Naval Post Graduate School state in part: "NPS does not agree with the changes proposed to 97.311(g) requiring the addition of "automatic transmitter power control." This is clearly counter to making the spread spectrum mode of communication more flexible and is itself superfluous as noted by Mr. Buas' reference to 97.313(a). The technical hurdles implied by this rule change are not trivial: and as pertains to space-based stations in particular, would pose an unnecessary burden on the design of the space segment of the communications link."

5. In his Reply Comments, Mr. Charles M. (Marty) Albert, K6UFM, states: "Again, this requirement [automatic power control] that (1) Would be nearly impossible to implement, (2) Would be totally impossible to enforce (3) Would be clearly discriminatory to SS and (4) Serve no clear purpose."

6. In its Comments, TAPR says in part: "Third, TAPR supports the ARRL's proposed change to 97.311(g) which would provide for automatic power control to limit the output power of and SS station to that which is required for communication, when more than one watt of output power is used. TAPR, however differs with ARRL as to just how simple to control the output power of a transmitter, it is quite another matter to make this control automatic and foolproof...."

7. In an unpublished paper presented at the 1996 Central States VHF Conference, Drs. Tomas A. Clark, W3IWI and Phillip Karn, KA9Q outlined the possibility of using SS techniques over a fairly narrow band to enhance the capability for weak signal amateur communication.

- Steve, N7HPR
(n7hpr@tapr.org)

40. Comments on FCC Spread Spectrum Rulemaking, WT Docket No.97-12

From: "Alan J. Eynon" <aeynon@micro.ti.com>
Date: Mon, 14 Apr 1997 13:09:13 -0500
To: fccinfo@fcc.gov
Cc: biltynan@ktc.com, ss@tapr.org, aeyn@micro.ti.com
Message-ID: <2.2.32.19970414180913.0069eddc@pcmail.micro.ti.com>

Before the

Federal Communications Commission
Washington, D.C. 20554

In the Matter of) WT Docket No.97-12
)
Amendment of Amateur Service) RM-8737
Rules to Provide For)
Greater Use of Spread)
Spectrum Communication)
Technologies)

To: The Commission

COMMENTS OF DR. ALAN J. EYNON, N3IRL

Background

I have been a member of the Amateur Radio service since obtaining an Advanced license in 1991. I have studied spread spectrum communications for over ten years, as a matter of both academic and professional interest.

Introduction

I have reviewed the Notice of Proposed Rulemaking and the comments of several individuals regarding the use of power control and band limitations to avoid interfering with existing services in the Amateur Radio bands. I believe that a simpler scheme can be proposed that - in addition to being technically easier and cheaper to implement - would be considerably more straightforward to enforce.

Summary

I wholeheartedly support the Commission's intent to liberalize the rules governing the use of spread spectrum in the Amateur Radio service. I believe that it is the intent of the Notice of Proposed Rulemaking to accomplish any such liberalization without sacrificing the interests of the extant Amateur Radio services. To this end, the Notice contains provisions for automatic power control, while comments by other users suggest that spread spectrum services should be confined to certain frequency ranges. The former would greatly increase the technical and monetary cost of any such equipment. The latter proposal (1) is misplaced and contrary to the intent that spread spectrum signals should be able to overlay existing signals without causing them interference. I intend to show that the critical factor of any such Rulemaking should be transmitted power spectral density. By tying the power of the transmitted spread spectrum signal to the bandwidth occupied by that signal, the Commission can satisfy existing Amateur Radio service operators that the new spread spectrum signals will not interfere with their operations. By avoiding the difficulties of implementing an automatic power control scheme, the Commission can lower the technical and monetary barrier to the use of spread spectrum technology in the Amateur Radio service.

Discussion

Automatic Power Control:

The issue of automatic power control centers around the technical problems of creating a uniform automatic power control scheme which would be effective in all Amateur Radio service scenarios. For instance, one kind of closed loop scheme would have the spread spectrum equipment at both ends of a link would monitor the received signal power and feed that information back to the transmitter. In this way, the transmitter only uses sufficient power to maintain a pre-set bit error rate. Unfortunately, such a scheme would cause grave difficulties in operating over satellite links, as the time delays inherent in such links would tend to make the feedback loop unstable.

Given unlimited additional expense, it is not out of the question that a suitably elaborate automatic power control scheme could be devised that would operate in all Amateur Radio service scenarios. However, I contend that such a burden would create an additional barrier to widespread adoption of spread spectrum techniques by Amateur Radio service operators, known for their frugality. One also must question the additional time it would take to agree on a standard for automatic power control, since requiring automatic power control without formal agreement as to how it would be implemented would only create additional dissension within the community of Amateur Radio service operators who wish to experiment with spread spectrum communications.

In light of my proposal (below) to control transmitted power spectral density, I find that requirements for automatic power control are a redundant and needless expense.

Spectral Partitioning:

The comments by AMSAT regarding weak signal operation (2) highlight their concern that unrestricted operation of spread spectrum signals could significantly degrade their ability to continue working in their current operational modes. Their arguments center on the expected levels of interference such overlaid signals could cause. In the spirit of co-operation that the goal of all Amateur Radio service operators, I believe I speak for all spread spectrum experimenters in stating that it is our goal that our overlaid spread spectrum signals cause no interference with existing Amateur Radio service operations. Rather than sequestering spread spectrum signals to unused portions of the Amateur bands, however, I proposed (3) that power limits can set such that no interference occurs. This will be discussed further in the following section.

(1) also goes on to propose that a narrowband form of spread spectrum might be acceptable on all bands above 50 MHz. This runs contrary to the previous argument about power spectral density and likely interference; a spread spectrum signal that utilize narrower bandwidths while maintaining the same power level will necessarily create a signal with a higher power spectral density with an greater likelihood of causing interference.

Again, these proposed restrictions would be unnecessary if the Commission were to regulate the power spectral density of the allowed spread spectrum signals. By restricting effective power levels based on the bandwidth of the transmitted signal, the Commission could guarantee that overlaid spread spectrum signals would not interfere with established Amateur Radio service operations, without resorting to frequency apartheid.

Power Spectral Density Proposal:

As I showed in (3), it is possible to work backwards from the most sensitive weak signal Amateur receiver, and determine the maximum effective transmitter power that the spread spectrum operator could use without causing interference. This would have to be calculated and set for each Amateur Radio band, as receiver characteristics for each band differ.

One would also want to regulate the spectral content of the spread spectrum signals, so that their transmitted power is spread as uniformly over their spreading bandwidth. In the direct sequence case, this means that the epoch (repetition) rate of the spreading sequence be no faster than the underlying data rate. For instance, to spread a 5000 bit per second signal over a 10 megaHertz bandwidth would require a spreading sequence running at 5 megachips per second. If that spreading sequence contained less than 1000 chips, it would repeat at a rate greater than 5000 Hertz, and the spectral content of the spread signal would no longer have a smooth and continuous presentation. The resulting discrete spectral elements potentially could create a higher-than-allowable power spectral density, thus causing interference.

Similar arguments concerning the number of carriers used by a frequency hopping system can be made. One would aim for the average power spectral content of a frequency hopping system to be the same as analogous direct sequence signals. Such regulations would also have to include minimum hopping rates (or hop dwell times), in the same fashion that direct sequence systems must have a minimum length spreading sequence.

Hybrid systems - if adopted - would be subject to both direct sequence and frequency hopping regulations, in a fashion such that the inclusion of direct sequence spreading of a hopped carrier would ameliorate frequency hopping spectral restrictions in proportion to the spreading factor the direct sequence spreading introduces, and vice versa. Again,

the intent would be that any spread signal, no matter what technique it utilized - would have to conform to the same regulation of power spectral density and spectral uniformity.

Conclusion -----

If adopted, a per-band regulation of maximum allowable power spectral density has the advantages that it:

- * does not interfere with established Amateur Radio service operations,
- * requires no further automatic power control measures,
- * does not restrict operation within the Amateur Radio service bands above HF,
- * eliminates cumbersome differentiation between different types of spread signals,
- * is easier to enforce,
- * would be less expensive to the Amateur community, hence potentially appealing to a larger group of experimenters.

RESPECTFULLY SUBMITTED,

By _____
Alan J. Eynon, N3IRL

May 14, 1997

Mailing Address:
5228 Woodlawn
Bellaire, TX 77401-3305

E-Mail: aeynon@micro.ti.com

Notes:

1. "COMMENTS OF WILLIAM A. TYNAN W3X0 / In the Matter of WT Docket No.97-12", as received via e-mail on 14 May 1997.
2. "Comments on the Spread Spectrum Proceedings by Bill Tynon W3X0 / In the Matter of RM-8737", as received via e-mail on 10 May 1996.
3. To quote my e-mail of 13 May 1996:

"I won't argue with Bill's numbers, but I don't believe their application corresponds to how those of us who design spread systems actually intend to use them. In short, I don't think his receiver's going to see us. Here's why:

I prefer to work backwards from Bill's numbers. Let's assume that I, too, have a receiver with a noise floor of -210 dBW/Hz over a 10 MHz reception bandwidth. Let's assume the main lobe of my spread signal fills the 10 MHz. That's a 5 Mchip/sec signal. So far, this is straight from what Bill said.

I'm going to assume that I can get 30 dB processing gain from that 5 Mchip/sec signal, so I'm either operating at 5 kbps BPSK, or 10 kbps QPSK.

I can normally demodulate a BPSK signal and get a decent bit error rate at an output (despread) SNR of 15 dB. This gives me a processing margin of 15 dB (30 - 15).

In other words, my signal can be 15 dB *below* the noise floor of my receiver, and I'll still get enough despread SNR for good BER performance. That's a received signal of -225 dBW/Hz.

Assuming the same path loss at 20 km (-110 dB), that means my transmitter power density is -115 dBW/Hz.

The signal is spread over 10 MHz (70 dBHz), so my transmitter EIRP must be -45 dBW, or about 32 uW.

If I've done the math right, *that's* where I'd be operating, at a level that won't even break the noise floor of Bill's receiver. In fact, that 15 dB processing margin equates to a factor of roughly 30 in signal power, and since signal power is inversely related to the square of the distance, his station can be over 5 times closer (no more than 4 km away), and my spread signal still won't interfere with his receiver. Alternately, there could be 30 of us on the same 10 MHz band, all 20 km from Bill, and he won't detect our presence. Even in the Balt/Wash area, I can't imagine there'll be enough hams doing SS to cause grief.

Rather than allocating discrete portions of spectrum for spread operations, wouldn't it be better to open all bands above HF to SS, but as a secondary user on a not-to-interfere basis? Certainly the FCC could set power levels, spreading rates, and suitably long sequences (to provide adequate spectral content for the signal, viz: it wouldn't make sense to use a 15 chip spreading sequence at 5 Mchip/sec, since the spread carrier tones would then be 333 kHz apart) to satisfy even the most discriminating EME and weak signal enthusiasts. And this would also give them access to all the bands, instead of (potentially) blocking portions with needlessly powerful SS transmissions.

I encourage further discussion on how both user communities can share the entire spectrum."

41. Re: [SS:1255] Re: Software for calculate microwave/RF links

From: Carol Byers <crlbyer@garlic.com>
Date: Mon, 14 Apr 1997 12:45:20 -0700
To: ss@tapr.org
Message-ID: <33528950.77A4@garlic.com>
Rendered body type: text/plain

Randy Roberts wrote:

>
> Dear Kleber & other SS SIG'ers:
>
> There is a lot of this sort of shareware available on my home page(s) --
> take a look at:
>
> <http://sss-mag.com/prop.html>
> <http://sss-mag.com/swindex.html>
> <http://sss-mag.com/eestuff.html>
> and finally <http://sss-mag.com/rfstuff.html>
>
> Enjoy the downloads & feel free to explore our site with nearly 200 pages of
> useful html info on RF, SS and electronic engineering / Ham stuff!
>
> 73 de KC6YJY, Randy Roberts
>
> -----
>
> At 01:57 AM 4/9/97 -0500, you wrote:
> >Hello...
> >
> > Where i acquire softwares (shareware or not) in the Internet for
> >calculate radio links ?
> > Thank's a lot !!!
> >
> >
> >
Hi Randy,

Thanks for the great reference sources...

Carol

42. address change

From: Kaprocki <fkaprocki@iag.net>
Date: Tue, 15 Apr 1997 16:41:16 -0400
To: ss@tapr.org
Message-ID: <1.5.4.32.19970415204116.006684b4@iag.net>
Rendered body type: text/plain

Please change my e-mail address OLD kaprocki@iag.net
 NEW fkaprocki @iag.net

thanks. kk4rw.

43. FAQ on Wavelan board for LINUX?

From: Jeff King <jeff@mich.com>
Date: Fri, 18 Apr 1997 01:39:49 -0400
To: ss@tapr.org
Message-ID: <2.2.32.19970418053949.0097a4ac@mail.mich.com>
Rendered body type: text/plain

Anyone point me to a FAQ on the WaveLan board under linux? Got the source for linux kernal in which wavelan support is compiled, but still have alot of questions. Anyone have any idea if the wavelan uses a native transport layer or does it just depend on IP for this? I have a lossy link using one of the WaveLan's and thought this might be missing.

Thanks ahead of time.

Regards,

```
-----  
| Jeff King      Aero Data Systems |  
| jeff@mich.com  P.O. Box 510895   |  
| (810)471-1787  Livonia, MI 48151 |  
| F(810)471-0279 United States     |  
-----
```

44. FAQ on Wavelan board for LINUX?

From: Jeff King <jeff@mich.com>
Date: Fri, 18 Apr 1997 01:43:31 -0400
To: ss@tapr.org
Message-ID: <2.2.32.19970418054331.0070c2b4@mail.mich.com>
Rendered body type: text/plain

Anyone point me to a FAQ on the WaveLan board under linux? Got the source for linux kernal in which wavelan support is compiled, but still have alot of questions. Anyone have any idea if the wavelan uses a native transport layer or does it just depend on IP for this? I have a lossy link using one of the WaveLan's and thought this might be missing.

Thanks ahead of time.

Regards,

```
-----  
| Jeff King      Aero Data Systems |  
| jeff@mich.com  P.O. Box 510895   |  
| (810)471-1787  Livonia, MI 48151 |  
| F(810)471-0279 United States     |  
-----
```

45. Re: [SS:1266] FAQ on Wavelan board for LINUX?

From: Fred Treasure <fred@astro.wnmu.edu>
Date: Wed, 16 Apr 1997 13:55:58 -0600 (MDT)
To: ss@tapr.org
Message-ID: <199704161955.NAA00916@a202.wnmu.edu>
Rendered body type: text/plain

>
> Anyone point me to a FAQ on the WaveLan board under
> linux? Got the source for linux kernal in which wavelan
> support is compiled, but still have alot of questions.
> Anyone have any idea if the wavelan uses a native transport
> layer or does it just depend on IP for this? I have a
> lossy link using one of the WaveLan's and thought this
> might be missing.

>
Jeff,

I've got some WaveLan links working with Linux. The cards act like regular Ethernet cards - they don't seem to have any special features that would help out with a bad path. I know that some of the other SS choices like the FreeWave radios and older Proxim radios have internal options that enhance their performance when operated in point-to-point links, but WaveLans don't.

Fred
fred@astro.wnmu.edu

46. Re: [SS:1265] FAQ on Wavelan board for LINUX?

From: Phil Karn <karn@qualcomm.com>
Date: Fri, 18 Apr 1997 01:48:17 -0700 (PDT)
To: ss@tapr.org
Message-ID: <199704180848.BAA08748@servo.qualcomm.com>
Rendered body type: text/plain

Last week at the Memphis IETF I had the opportunity to borrow a Digital Roam About PCMCIA card for my Linux laptop. I'm told this is a clone of a Wavelan.

>From what I can see, the link layer in Wavelan is identical to Ethernet with the addition of a 16-bit network ID. If this field is in use, it's stamped on all outbound packets and the receiver only responds to packets with the right network ID. That lets separate networks overlap somewhat in coverage without causing too much confusion.

Without a "roaming driver" I had to select one of four base stations by hand, and since the user-level command to do this seemed to be missing I had to do it by loading one of four driver kernel modules with the network IDs hard-coded in. If anybody comes across any of this software for Linux I'd really appreciate it...

Phil

47. Re: [SS:1268] Re: FAQ on Wavelan board for LINUX?

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Fri, 18 Apr 1997 08:50:08 -0400 (EDT)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.970418084704.6636B-100000@uhf.wdc.net>
Rendered body type: text/plain

> Without a "roaming driver" I had to select one of four base stations
> by hand, and since the user-level command to do this seemed to be
> missing I had to do it by loading one of four driver kernel modules

"Roaming" only works under Windows with DEC's own driver. It uses a proprietary beaconing protocol. Portland State University (under DARPA funding) wrote their own version (nicknamed "mip") which is supposed to be IETF mobile IP compliant, but this only runs under FreeBSD and uses FreeBSD's tunneling devices.

Bernie

48. Re: [SS:1268] Re: FAQ on Wavelan board for LINUX?

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Fri, 18 Apr 1997 19:56:22 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199704181956.TAA20499@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

Phil Karn <karn@qualcomm.com> wrote:
> Last week at the Memphis IETF I had the opportunity to borrow a Digital
> Roam About PCMCIA card for my Linux laptop. I'm told this is a clone
> of a Wavelan.
>
> From what I can see, the link layer in Wavelan is identical to
> Ethernet with the addition of a 16-bit network ID. If this field is in
> use, it's stamped on all outbound packets and the receiver only
> responds to packets with the right network ID. That lets separate
> networks overlap somewhat in coverage without causing too much
> confusion.
>
> Without a "roaming driver" I had to select one of four base stations
> by hand, and since the user-level command to do this seemed to be
> missing I had to do it by loading one of four driver kernel modules
> with the network IDs hard-coded in. If anybody comes across any of
> this software for Linux I'd really appreciate it...

Somebody at MIT was working on a driver with roaming support - check out <http://www.pdos.lcs.mit.edu/~adj/wavelan.html>. Looks like this effort is well behind schedule or possibly abandoned, though.

With regard to the WavelAN protocol stack, the 16-bit network ID is actually added at the PHY layer. The frame structure at the MAC layer is identical to IEEE 802.3, but of course the MAC protocol uses CSMA/CA instead of CSMA/CD. There doesn't seem to be anything implemented at the link layer to improve the integrity of the data link (to answer Jeff's question), but hey, if you're fond of kludges, you could always use AX.25. :-) No fooling, it's been done - see

<http://www.latnet.lv/LATNET/RADIOLink/HTMLDocument.html>.

Barry

--

Barry McLarnon VE3JF/VA3TCP	Internet: bm@hydra.carleton.ca
Ottawa Amateur Radio Club	AMPRnet: bm@lynx.ve3jf.ampr.org
Packet Working Group	Web: http://hydra.carleton.ca

49. Re: [SS:1269] Re: FAQ on Wavelan board for LINUX?

From: Phil Karn <karn@qualcomm.com>
Date: Fri, 18 Apr 1997 14:39:26 -0700 (PDT)
To: ss@tapr.org
Message-ID: <199704182139.OAA10939@servo.qualcomm.com>
Rendered body type: text/plain

Many of the Roam About users at IETF last week were running FreeBSD and had a roaming driver specifically for FreeBSD that seemed to work pretty well. I think they got it from Steve Stuart at DEC.

Once I figured out what the network ID field was and how it was used, I created four versions of the wavelan_cs.o kernel module, one with each of the four network IDs in use. Then I'd load the appropriate module depending on where I was in the hotel (I had the base stations mapped out). Crude and tedious, but effective.

Phil

50. Re: [SS:1268] Re: FAQ on Wavelan board for LINUX?

From: Fred Kehler <clearbrook_technical@mindlink.bc.ca>
Date: Fri, 18 Apr 1997 15:41:10 -0700
To: ss@tapr.org
Message-ID: <199704182241.PAA05406@linux.clrtech.com.>
Rendered body type: text/plain

Hi Phil,
in place of the 'roaming driver' i've been using the 'Wireless extensions' for linux. The iwconfig command lets you change the network ID on the fly and also move the freq in the case of 2.4Ghz cards
a handy feature of iwconfig also lets you set the network ID function to 'off' which makes all the wavelan traffic seen by the card visble with tcpdump...

At 03:53 AM 18/04/97 -0500, you wrote:
>Last week at the Memphis IETF I had the opportunity to borrow a Digital
>Roam About PCMCIA card for my Linux laptop. I'm told this is a clone
>of a Wavelan.
>
>>From what I can see, the link layer in Wavelan is identical to
>Ethernet with the addition of a 16-bit network ID. If this field is in
>use, it's stamped on all outbound packets and the receiver only
>responds to packets with the right network ID. That lets separate
>networks overlap somewhat in coverage without causing too much
>confusion.
>
>Without a "roaming driver" I had to select one of four base stations
>by hand, and since the user-level command to do this seemed to be
>missing I had to do it by loading one of four driver kernel modules
>with the network IDs hard-coded in. If anybody comes across any of
>this software for Linux I'd really appreciate it...
>
>Phil
>
>
>
>
>
>
>

Fred Kehler (ve7ipb)
Clearbrook Technical Services Ltd. clearbrook_technical@mindlink.bc.ca.

51. Re: [SS:1272] Re: FAQ on Wavelan board for LINUX?

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Fri, 18 Apr 1997 21:09:40 -0400 (EDT)
To: ss@tapr.org

Message-ID: <Pine.BSF.3.95.970418210920.9542A-100000@uhf.wdc.net>
Rendered body type: text/plain

> Hi Phil,
> in place of the 'roaming driver' i've been using the 'Wireless extensions'
> for linux. The iwconfig command lets you change the network ID on the fly
> and also move the freq in the case of 2.4Ghz cards
> a handy feature of iwconfig also lets you set the network ID function to
> 'off' which makes all the wavelan traffic seen by the card visble with
> tcpdump....

Where might I be able to find the source code to iwconfig?

Thanks.

Bernie

52. Re: [SS:1273] Re: FAQ on Wavelan board for LINUX?

From: Jerry Normandin <jerryn@ici.net>
Date: Fri, 18 Apr 1997 22:19:23 -0400
To: ss@tapr.org
Message-ID: <33582BAB.58658998@ici.net>
Rendered body type: text/plain

At any sunsite mirror. I have been using this code for over a year and shared my thoughts about it on this newsgroup. BUT>>>>
Most people here rejected the idea of using a PC and Linux for Wireless Internet Access. Well.....I have 6 nodes running now that are wireless and customers can access the net at speeds of 2MBS by wireless with no airtime charge. All they do is pay for the internet access. Airtime of course is FREE. It's far better and cheaper than accessing the net through baby bells.

Linux Rules that's for sure. I've been testing the new wireless router code from MIT with these babys.

>
> > Hi Phil,
> > in place of the 'roaming driver' i've been using the 'Wireless extensions'
> > for linux. The iwconfig command lets you change the network ID on the fly
> > and also move the freq in the case of 2.4Ghz cards
> > a handy feature of iwconfig also lets you set the network ID function to
> > 'off' which makes all the wavelan traffic seen by the card visble with
> > tcpdump....
>
> Where might I be able to find the source code to iwconfig?
>
> Thanks.
>
> Bernie

53. Re: FAQ on Wavelan board for LINUX?

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Sat, 19 Apr 1997 17:52:42 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199704191752.RAA22228@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

This was bounced by the listserver. If you quote a previous message, you must make sure that the quoted text does not contain a Message-Id: header (or at least that the quoted text is delineated by ">" characters or some such). Otherwise, the listserver will reject your message as a duplicate.

-Barry

ss@tapr.org wrote:
> A message with Message-Id: <33582BAB.58658998@ICI.NET> (appearing
> in the body) matches entries in the list's .message.ids file.
>
> The message is included below:
> -----
> From ssampson@oklahoma.net Sat Apr 19 12:15:08 1997
> Received: from dns.okc (dns.oklahoma.net [208.2.112.2]) by tapr.org
> (8.7.5/8.7.3/1.9) with SMTP id MAA11568 for <ss@tapr.org>; Sat, 19 Apr 1997
> 12:15:05 -0500 (CDT)
> Received: from chalice.site.net by dns.okc (SMI-8.6/SMI-SVR4)
> id MAA10744; Sat, 19 Apr 1997 12:19:58 -0500

```

> Message-Id: <199704191719.MAA10744@dns.okc>
> From: "Steve Sampson" <ssampson@oklahoma.net>
> To: <ss@tapr.org>
> Subject: Re: [SS:1274] SS digest 295
> Date: Sat, 19 Apr 1997 12:10:31 -0500
> X-MSMail-Priority: Normal
> X-Priority: 3
> X-Mailer: Microsoft Internet Mail 4.70.1155
> MIME-Version: 1.0
> Content-Type: text/plain; charset=ISO-8859-1
> Content-Transfer-Encoding: 7bit
>
> I have 6 users on 1 node.
> Does that mean I get a gold star to your silver? :-)
>
> Seriously though, I don't understand why it takes 6 nodes??
> Do you have your antennas pointing in 6 different directions??
> Or, do you have 6 nodes in various parts of town all tied
> together via telco or another radio?
>
> Steve
> -----
>
> Date: Fri, 18 Apr 1997 22:19:23 -0400
> From: Jerry Normandin <jerryn@ici.net>
> To: ss@tapr.org
> Subject: Re: FAQ on Wavelan board for LINUX?
> Message-ID: <33582BAB.58658998@ici.net>
>
> I have 6 nodes running now that are wireless and customers
> can access the net at speeds of 2MBS by wireless with no airtime charge.

```

54. Re: [SS:1274] Re: FAQ on Wavelan board for LINUX?

```

From: Jeff King <jeff@mich.com>
Date: Sat, 19 Apr 1997 19:15:42 -0400
To: ss@tapr.org, jerryn@ici.net
Message-ID: <2.2.32.19970419231542.00707f28@mail.mich.com>
Rendered body type: text/plain

At 09:23 PM 4/18/97 -0500, Jerry Normandin wrote:
>At any sunsite mirror. I have been using this code for over a
>year and shared my thoughts about it on this newsgroup. BUT>>>>
>Most people here rejected the idea of using a PC and Linux for
>Wireless Internet Access.

Your kidding, right? A significant number of people (myself included)
are using one form of SS or another for wireless internet access. Not
sure how you came up with the idea anyone here was rejecting wireless
internet access... possibly your confusing this group with BBSSIG or
something.

>Well.....I have 6 nodes running now
>that are wireless and customers can access the net at speeds of 2MBS
>by wireless with no airtime charge.

```

Best throughput I've gotten with the Linux WaveLan driver has been 75kbytes/sec. Generally it averages around 50-55kbytes/sec. This is with the 900mhz version of the WaveLan (ISA) into a 10dbi corner reflector. I'd be interested in hearing some more detailed information as to your setup as well as your experinices with the MIT code.

Regards,

```

-----
| Jeff King      Aero Data Systems |
| jeff@mich.com  P.O. Box 510895   |
| (810)471-1787  Livonia, MI 48151 |
| F(810)471-0279 United States     |
-----

```

55. Re: [SS:1270] Re: FAQ on Wavelan board for LINUX?

```

From: Jeff King <jeff@mich.com>
Date: Sat, 19 Apr 1997 19:21:27 -0400
To: ss@tapr.org, bm@lynx.ve3jf.ampr.org
Message-ID: <2.2.32.19970419232127.00706cf8@mail.mich.com>
Rendered body type: text/plain

```

At 03:01 PM 4/18/97 -0500, Barry McLarnon VE3JF wrote:

>
>With regard to the WaveLAN protocol stack, the 16-bit network ID is actually
>added at the PHY layer. The frame structure at the MAC layer is identical to
>IEEE 802.3, but of course the MAC protocol uses CSMA/CA instead of CSMA/CD.
There
>doesn't seem to be anything implemented at the link layer to improve the
>integrity of the data link (to answer Jeff's question), but hey, if you're fond
>of kludges, you could always use AX.25. :-) No fooling, it's been done - see
><http://www.latnet.lv/LATNET/RADIOLink/HTMLDocument.html>.
>
>Barry

Thanks Barry. Trying to run appletalk over a WaveLan link, and it seems to need
som sort of underlying link layer.

Regards,

```
-----  
| Jeff King      Aero Data Systems |  
| jeff@mich.com P.O. Box 510895   |  
| (810)471-1787 Livonia, MI 48151 |  
| F(810)471-0279 United States    |  
-----
```

56. Reed Solomon source code

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Sun, 20 Apr 1997 11:06:59 -0400 (EDT)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.970420105927.17483A-100000@uhf.wdc.net>
Rendered body type: text/plain

Hi Gang:

I know there are some coding experts among you (especialy Phil KA9Q).
As part of a school homework I am trying to give an overview of FEC, with
emphasis on convolutional coding/Viterbi decoding AND Reed Solomon coding.

I understand convolutional coding and Viterbi decoding well enough to be
explain it (I think), but having lots of trouble with Reed Solomon.

On a different (but also a school project), I have to code both
convolutional/Viterbi and Reed Solomon coding. I don't have a problem
with the former, but with Reed Solomon I do (since I don't even understand
it fully).

One of my problems, is that none of the 10 books I have on the subject
give you an algorithms (pseudocode) presentation of Reed Solomon (they
all explain it over GF()) and that's where they lose me. It would
help me immensely, if I could get my hands on sample C code for
implementing Reed Solomon or if someone could point me to a pseudo code
description and could help me answer with answering some questions via
private email. (None of the profs at school are FEC experts, so I have to
look to outside help).

THANKS!

Bernie nuls

57. Re: [SS:1270] Re: FAQ on Wavelan board for LINUX?

From: Jeff King <jeff@mich.com>
Date: Mon, 21 Apr 1997 00:49:53 -0400
To: ss@tapr.org, bm@lynx.ve3jf.ampr.org
Message-ID: <2.2.32.19970421044953.006b52ec@mail.mich.com>
Rendered body type: text/plain

At 03:01 PM 4/18/97 -0500, Barry McLarnon VE3JF wrote:

There
>doesn't seem to be anything implemented at the link layer to improve the
>integrity of the data link (to answer Jeff's question), but hey, if you're fond
>of kludges, you could always use AX.25. :-) No fooling, it's been done - see
><http://www.latnet.lv/LATNET/RADIOLink/HTMLDocument.html>.
>
>Barry

That of course is using JNOS/DOS (the advanced case). Do you think that
something like that is possible just using LINUX? Possibly with Allan
Coxes ax.25 drivers.... not sure as I haven't played with them. BTW,

is that really a kludge? I mean, with no link layer in the WaveLan I'm not sure adding one could be consider a kludge in the negative sense. Its certainly a kludge in the sense (in my opinion) the wavelan should have that already built in.
Regards,

```
-----
| Jeff King      Aero Data Systems |
| jeff@mich.com  P.O. Box 510895   |
| (810)471-1787  Livonia, MI 48151 |
| F(810)471-0279 United States     |
-----
```

58. Re: [SS:1278] Reed Solomon source code

From: RLANIER@mailb.harris.com (RLANIER)
Date: Mon, 21 Apr 1997 08:32:46 -0400
To: ss@tapr.org
Message-ID: <35b5e480@mailb.harris.com>
Rendered body type: text/plain

Hi Bernie,

I would really like to see what you come up with. I am very interested in FEC codes, especially appling them to an SS radio project.

Let me know what you come up with!

Tony KE4ATO

Reply Separator

Subject: [SS:1278] Reed Solomon source code
Author: ss@tapr.org at smtp
Date: 4/20/97 10:10 AM

Hi Gang:

I know there are some coding experts among you (especialy Phil KA9Q). As part of a school homework I am trying to give an overview of FEC, with emphasis on convolutional coding/Viterbi decoding AND Reed Solomon coding.

I understand convolutional coding and Viterbi decoding well enough to be explain it (I think), but having lots of trouble with Reed Solomon.

On a different (but also a school project), I have to code both convolutional/Viterbi and Reed Solomon coding. I don't have a problem with the former, but with Reed Solomon I do (since I don't even understand it fully).

One of my problems, is that none of the 10 books I have on the subject give you an algorithms (pseudocode) presentation of Reed Solomon (they all explain it over GF()) and that's where they lose me. It would help me immensely, if I could get my hands on sample C code for implementing Reed Solomon or if someone could point me to a pseudo code description and could help me answer with answering some questions via private email. (None of the profs at school are FEC experts, so I have to look to outside help).

THANKS!

Bernie nuls

59. Re: [SS:1262] Comments on FCC Spread Spectrum Rulemaking, WT Docket No.97-12

From: Phil Karn <karn@qualcomm.com>
Date: Mon, 21 Apr 1997 17:59:49 -0700 (PDT)
To: ss@tapr.org
Message-ID: <199704220059.RAA20073@servo.qualcomm.com>
Rendered body type: text/plain

I am just catching up on my email (I was sick the early part of last week, and it's amazing how a thousand messages can pile up in just a few days...)

Anyway, it's interesting to see the 97-12 comments claim that automatic power control won't work on satellite channels. I happen to work for a company that has bet quite a bit of money that it can.

Qualcomm's Globalstar project is designed to run power-controlled CDMA over the bent-pipe satellite channel. Yes, the increased delay makes

it a little harder, but working in our favor is the fact that the satellite channel propagation loss, even for a mobile terminal, is much less variable than the terrestrial channel. Even when there's intermittent blockage from terrain or foliage, the satellite channel is best modeled as a Ricean channel because the direct path dominates. The terrestrial channel, not being generally line of sight, is better modeled as a Rayleigh channel, which is much more variable.

Also, since the proposed power-control rule doesn't say anything about the time interval over which the mechanism must operate, there's nothing inherent about the satellite channel that breaks automatic power control.

Phil

60. Proxim RangeLan2

From: Jeff King <jeff@mich.com>
Date: Tue, 22 Apr 1997 22:38:40 -0400
To: ss@tapr.org
Message-ID: <2.2.32.19970423023840.00730bc4@mail.mich.com>
Rendered body type: text/plain

Hello:

Anyone have any field experince with the Proxim rangelan2? How well does it compare to other 2.5ghz products in its performance class. Anyone use the Linux driver for it yet?

Regards,

```
-----
| Jeff King      Aero Data Systems |
| jeff@mich.com  P.O. Box 510895   |
| (810)471-1787  Livonia, MI 48151 |
| F(810)471-0279 United States     |
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61. Bell Labs Unveils 10-Megabit Wireless-Network Technology, Offering Five Times Today's Highest Data-Transmission Capacity

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Wed, 23 Apr 1997 04:57:29 -0700
To: dewayne-net@warpspeed.com (Dewayne's Wireless News List), ss@tapr.org
Message-ID: <v03102853af83a87f4996@[204.118.182.22]>
Rendered body type: text/plain

Bell Labs Unveils 10-Megabit Wireless-Network Technology, Offering Five Times Today's Highest Data-Transmission Capacity

Source: PR Newswire

MURRAY HILL, N.J., April 22 /PRNewswire/ via Individual Inc. -- Bell Labs scientists have patented a new technology they call DS/PPM that makes it possible for radio- frequency-based wireless local area networks (LANs) to handle 10 megabits of information per second. That's five times as much data as today's highest- capacity wireless LANs within the bandwidth defined by the upcoming IEEE 802.11 standard.

Bell Labs' parent company, Lucent Technologies (NYSE: LU), is a global leader in wireless LANs with its award-winning WaveLAN(R) product line.

Current-generation wireless LANs are limited to approximately a 2-megabit (million-bit) per second transmission capacity. The patented DS/PPM (Direct Sequence/Pulse Position Modulation) technology promises robust and reliable wireless data-transmission rates of up to 10 megabits per second. This improvement in bandwidth will allow faster and more reliable wire-free computing throughout buildings and campus environments than is currently available.

DS/PPM was invented at Bell Labs by researcher Rajeev Krishnamoorthy, of the Communications Sciences Research division, and Israel Bar-David, now a faculty member of the Technion in Israel.

With DS/PPM, users whose need for highly data-intensive applications have kept them deskbound will be able to roam freely within a complex or campus, able to access the Internet and their company's intranet from anywhere on the grounds. Physicians will be able to call up high-resolution X-rays and medical records while next to their patients;

manufacturing engineers, to download complex drawings and designs while repairing equipment; auto dealers, to show customers mini-videos on specific cars they wish to buy; emergency-service workers, to photograph and transmit situational information to health agencies immediately -- all from anywhere on their complex or campus, even from across town.

Educators will be able to call up color photographs and videos from a central server location and display them on hand-held, portable and desktop computers in classrooms scattered throughout a school site. In fact, a teacher could take a class outside, gather everyone around a portable computer, and augment the curriculum with high-quality interactive, multimedia information transmitted, without wires, from a central location.

In addition to the proven strengths of wireless -- flexibility and easy adaptability to locations of all types -- DS/PPM provides several other technological advantages over other wireless systems. Transmitting at the 2.4-gigahertz band, DS/PPM uses DSSS (Direct Sequence Spread Spectrum) technology to maximize resistance to noise and interference as well as ensuring reliability and robustness. DS/PPM will also allow compatibility with the new generation of IEEE 802.11-compatible wireless LANs.

"This 10-megabit-per-second technology, using the existing IEEE-defined bands enables high speed within a standard-compliant environment. This is what our customers are asking us for and clearly establishes the superiority of the DSSS modulation scheme over FHSS (Frequency Hopping Spread Spectrum) technology," said Bruce Tuch, director of engineering for Lucent's WaveLAN group. "The new Bell Labs modulation scheme increases to 10 megabits per second the amount of information transmitted, without replacing the underlying DSSS technology."

"To achieve the faster rates, Bell Labs researchers have combined QAM (Quadrature Amplitude Modulation) and Pulse Position Modulation," explained Rich Gitlin, Bell Labs vice president, Communications Sciences Research. "These techniques extend the proven technology base used in WaveLAN and other existing DSSS implementations."

The research was done at Bell Labs' facility in Utrecht, the Netherlands, which is devoted to wireless data networking.

Bell Labs is the research and development arm of Lucent Technologies, whose WaveLAN wireless local-area network product line includes -- in both 915-megahertz and 2.4-gigahertz versions -- the WaveLAN/PCMCIA system for notebook and portable computers, WaveLAN/AT interface for desktop stations, WavePOINT access point, WaveAROUND roaming software, WaveMONITOR site installation program and WaveMODEM wireless modem for OEM products.

Additional information about the WaveLAN family is available on the worldwide web at <http://www.wavelan.com> or by calling 1-800-WAVELAN.

Lucent designs, builds and delivers a wide range of public and private networks, communications systems and software, consumer and business telephone systems and microelectronics components. Further information about Lucent Technologies is available on the worldwide web at <http://www.lucent.com>.

Comments From Industry Analysts About Bell Labs - Lucent Technologies

DS/PPM Technology

"This technology will have a great impact on the industry. It should greatly accelerate the adoption of wireless LANs in enterprises and business environments." -- Veronica Guerrero, DataQuest

"Bell Labs has upped the ante. Ten-megabit transmission is phenomenal. It would be great for airlines, among others, with their time-critical situations and need for fast access to information." -- Tom Esperson, Yankee Group

"End users and the industry alike have been waiting for solid ten-megabit technology since the beginning of wireless LANs. One of the most attractive features of DS/PPM is that it supports the bandwidth defined within the IEEE 802.11 standard, which neatly addresses the issue of interoperability." -- Virginia Brooks, Aberdeen Group

"This new technology will appeal to notebook computer users who require full Ethernet performance as well as mobile access to various

applications and files on a departmental LAN." -- Sonina Velasquez, Tech Research

Additional Technical Information -- Bell Labs DS/PPM Technology

Bell Labs design engineers have developed algorithms and signal-processing techniques that can significantly boost wireless LAN data rates up to 10-Mbps peak rates. The new wireless LAN nodes will be fully backward-compatible with IEEE products that operate at 2- or 1-Mbps rates.

A DSSS transmitter operates on an incoming data stream of a certain bit rate per second. The incoming bit stream is typically converted into a symbol stream in which each symbol represents a group of 1, 2 or more bits. Modulation techniques similar to those used in voice-band data modems are used on the symbol stream to generate the transmitted signal. The DSSS transmitter modulates or multiplies each data bit or symbol with a pseudorandom noise sequence, also called a "chip" sequence. This multiplication provides the spreading phenomenon.

Lucent's existing WaveLAN products, for example, use DQPSK (differential quadrature phase shift keying) modulation, and the draft IEEE 802.11 standard also specifies DQPSK. In a QPSK or DQPSK modulator, symbols are differentiated by the phase of a sinusoidal wave. Each symbol can be represented by a point in a symbol constellation plotted on a standard Cartesian graph. The so-called I (in-phase) and Q (quadrature phase) axes of the graph actually represent the cosine and sine of the phase angle, respectively.

The existing DSSS scheme employs a constant symbol period, and the correlator in the receiver will locate each succeeding symbol exactly one symbol period after the preceding symbol. In operation, a DSSS receiver employs an autocorrelation function that generates a pulse one chip wide when the codeword shifted into the circuit is correlated with a filter matched to the Barker code. The pulse is centered in the symbol period.

PPM essentially overlaps some symbol periods, thereby varying the time between consecutive autocorrelation peaks. The new scheme allows the detection of eight distinct pulse positions out of an 11-chip symbol. Moreover, the pulse positioning and correlation is independently implemented on the I and Q channels thereby providing the ability to convey 64 (8*8) distinct information states. When combined with the QPSK capability of two distinct I states and two distinct Q states, PPM yields 256 (64*2*2) possible states or 8 bits/symbol. Therefore, PPM applied to current DSSS technology would yield 8-Mbps peak data rates.

Bell Labs intends to further extend the peak data rate by moving to QAM modulation. While QPSK maps two bits to a symbol by only varying phase, QAM can map even more bits into a symbol by varying phase and amplitude in a more complex I/Q constellation. To yield a 10-Mbps peak rate, the Bell Labs scientists adopted a QAM scheme and four distinct states for both I and Q. When combined with PPM, the scheme yields 1024 (64*4*4) possible states or 10 bits/symbol for a 10-Mbps peak rate.

SOURCE Lucent Technologies

/CONTACT: Donna Cunningham of Bell Labs - Lucent Technologies, 802-482-3748, home: 802-482-2933, or donnac@lucent.com; or Mark Shapiro of Davis-Marrin Communications, 619-573-0736 or dmc@cts.com/ (LU)

[04-22-97 at 09:51 EDT, PR Newswire]

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Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com  
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM  
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>  
Fax: (510) 770-9854 !  
~~~~~

62. Re: [SS:1280] Re: Reed Solomon source code

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Mon, 28 Apr 1997 16:33:39 -0400 (EDT)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.970428163135.2361A-100000@uhf.wdc.net>
Rendered body type: text/plain

> Hi Bernie,
>
> I would really like to see what you come up with. I am very interested
> in FEC codes, especially applying them to an SS radio project.
>
> Let me know what you come up with!
>
> Tony KE4AT0

Hi Tony:

Sorry for taking so long to answer.

I actually found some sample code for RS (look at <http://www.scotweb.com/4i2i/fec.htm>), but I certainly don't understand it yet.

The good news is I am finishing up my web page on convolutional coding and Viterbi decoding. At least I think I have sufficient understanding for this task.

Bernie

63. Re: [SS:1284] Re: Reed Solomon source code

From: Phil Karn <karn@qualcomm.com>
Date: Mon, 28 Apr 1997 16:59:43 -0700 (PDT)
To: ss@tapr.org
Message-ID: <199704282359.QAA12362@servo.qualcomm.com>
Rendered body type: text/plain

Anybody looking for FEC software should see my own web page:

<<http://people.qualcomm.com/karn/ham.html>>

On it you will find fast C code for both a Viterbi decoder and a Reed-Solomon decoder, as well as a Fano decoder. It is free for ham radio use.

Phil

64. Re: [SS:1285] Re: Reed Solomon source code

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Mon, 28 Apr 1997 21:41:45 -0400 (EDT)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.970428214120.3304A-100000@uhf.wdc.net>
Rendered body type: text/plain

> Anybody looking for FEC software should see my own web page:

>

> <<http://people.qualcomm.com/karn/ham.html>>

>

> On it you will find fast C code for both a Viterbi decoder and a
> Reed-Solomon decoder, as well as a Fano decoder. It is free for ham
> radio use.

>

> Phil

>

Thanks!! Why I didn't ask you earlier is beyond me!

73

Bernie

65. SS ID

From: Phil Karn <karn@qualcomm.com>
Date: Mon, 28 Apr 1997 20:05:12 -0700 (PDT)
To: ss@tapr.org
Message-ID: <199704290305.UAA12767@servo.qualcomm.com>
Rendered body type: text/plain

Hi Guys,

A full-blown debate has erupted in my mailbox over the past full days. It started when Bill Tynan posted AMSAT's draft comments to the FCC on the SS NPRM, and I was asked for my reaction.

The funny thing about AMSAT's comments is that they were identical to

Tynan's personal comments (posted a week earlier) with the name simply changed. And of course Tynan has either ignored or deliberately slanted everything we've said in favor of liberalized SS operation while still claiming to be in favor of innovation.

Anyway, some other, more reasonable people have brought up the narrowband ID issue. That is, they'd be more willing to accept SS if they could find an easy way to identify an interfering signal with narrowband equipment. This is a reasonable request.

I don't know if we ever really discussed it here, but I am thinking along the following lines.

1. If a SS signal is too weak to cause QRM, there is no need to identify it.
2. If a SS signal is strong enough to QRM a narrowband receiver, then a narrowband ID of equal power spectral density will be copyable.
3. The absolute last thing you want is to periodically stop your SS emission and funnel full power into a narrowband CWID. Even if your SS emission didn't bother anybody, such an ID sure could!

So as a goodwill gesture to the satellite and weak signal crowds I'm proposing a rule that above a certain power level (TBD) SS transmissions would have to be IDed with Morse Code at a power spectral density not to exceed that of the SS emission as a whole as measured in a 3Khz (SSB) bandwidth.

The rule would allow many different implementations: unbalancing the spreading mixer of a DS system slightly to inject a weak carrier component that could be keyed on and off; injecting keyed CW tones at other RF frequencies; keying a frequency notch out of the spread signal (most easily done with fast frequency hopping by simply gating the transmitter off when it lands in the notch during a key-up interval in the CWID); keying the whole emission off and on (best for highly coded low speed emissions where the interleaver could "ride through" the keyup intervals). There are probably other methods that would work too, and all could be copied in narrowband receivers.

Comments?

Phil

66. Re: [SS:1287] SS ID

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Mon, 28 Apr 1997 23:26:23 -0500
To: ss@tapr.org
Cc: " Tom Clark "<clark@tomcat.gsfc.nasa.gov>
Message-ID: <v03020904af8b1e5a488a@[208.134.134.40]>
Rendered body type: text/plain

>So as a goodwill gesture to the satellite and weak signal crowds I'm
>proposing a rule that above a certain power level (TBD) SS
>transmissions would have to be IDed with Morse Code at a power
>spectral density not to exceed that of the SS emission as a whole as
>measured in a 3Khz (SSB) bandwidth.

>The rule would allow many different implementations: unbalancing the
>spreading mixer of a DS system slightly to inject a weak carrier
>component that could be keyed on and off; injecting keyed CW tones at
>other RF frequencies; keying a frequency notch out of the spread
>signal (most easily done with fast frequency hopping by simply gating
>the transmitter off when it lands in the notch during a key-up
>interval in the CWID); keying the whole emission off and on (best for
>highly coded low speed emissions where the interleaver could "ride
>through" the keyup intervals). There are probably other methods that
>would work too, and all could be copied in narrowband receivers.

>
>Comments?

Why does it not surprise me that Bill's comments are going to be those of AMSAT. I hope that you have some influence on the AMSAT Board before the filling, but past experience doesn't seem to indicate that much influence Bill on this subject. I sent a set of messages to Tom Clark on this issue in January which he posted to the AMSAT board. Maybe they are aware of the concern I have about the possible damage of poor rules for SS could have on future satellite SS operations.

My personal comment is that I couldn't disagree with you more Phil.

At best, RM-8737 and Docet 97-12 were some of the poorest written rule making I have seen from the WTB in some time. This is one reason we are having these debates on the issues that should be simple in nature.

It comes down to this. Rules that the amateur community gets implemented now -- we are going to have to live with for possibly another 10+ years. Are we willing to have this IDing issue in the rules for years and years that could vastly limit people doing new designs. We need to implement rules that are open. We can't have additions to the rules for special interests within the hobby, just because they are potentially afraid of new technology. Amateur radio changes -- at least it is suppose to if the rules allows change. The things I keep seeing that could be added when we started by trying to simply delete things -- could drastically limit future growth. Maybe this is a tactic by those that just want the status quo for the next ten years when it might not matter to them who is operating.

Every time a group has an concern with Spread Spectrum someone shows up with a fix that concerns power limitations. I have a license that says I can operate various power limits. I might as well start tuning up in the weak signal band with wide band amps at 1000 watts. Why don't I ? Because I know that there are other there and it wouldn't be nice. We should not limit the operations of a mode (i.e. second class citizen) all because someone is concerned about bad operating. The rules should be written to benefit those that operate correctly, not limit it because a few could operate poorly. Those are bad rules if we write them to take in account the 1% of the community instead of the 99% of the community.

We have rules to handle all the various issues. Having Morse Code IDing is the most ridiculous concept I have heard of on a potentially advanced mode such as Spread Spectrum. We might as well revert back to just running 300 baud on HF.

The FCC is ready to allow us the changes we are asking for. If we file comments giving into various special interests that want limitations placed on the technology, then that gives them credence for the FCC to consider during the rules process. We need to ask for all the things we want in the rule making -- in-band IDing, 50Mhz and up, no power limitations and the rest. This is amateur radio, not a commercial service, not Part 15, not anything else.

We are back to adding rules to something we started out trying to simplify greatly. This doesn't make sense. Let's stick with deleting rules from Part 97 to open them up, not adding more limitations to what amateur can design and experiment with as a fun, learning, and educational experience.

It is time to make Part 97 into rules that fit on a few sheets that are easy to read instead of something that requires a lawyer with a spectrum analyzer to determine if a radio is legal or not.

Now on a technical issue -- what about hybrid systems or other methods that people might use ? DS is you example. If I am jumping between bands with a hybrid system -- where do I ID ? Each band hope ? On every band ? Just on the band I am at when the 10 min ID hits ? Can I ID at 300 wpm ? Again -- a simple rule that makes sense on the surface for a few modes of operations might not really fit an entire mode called Spread Spectrum. This again comes down to being something that is agreed upon when systems are being designed, not something defined in the rules.

Cheers - Greg, WD5IVD

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

67. Re: [SS:1288] Re: SS ID

From: Phil Karn <karn@qualcomm.com>
Date: Mon, 28 Apr 1997 23:36:39 -0700 (PDT)
To: ss@tapr.org
Message-ID: <199704290636.XAA13106@servo.qualcomm.com>
Rendered body type: text/plain

Okay Greg, you've convinced me. The rules should be as liberal as possible, and we should rely on "best current practice" to set standards for ID, etc.

Automatic power control and CWIDs should probably be on the list of "best current practice". BTW, the CWID really isn't that hard to implement, and by the very nature of spread spectrum it wouldn't bother the spread signal. But I agree there could be situations where it's not totally trivial.

Phil

68. Re: [SS:1287] SS ID

From: Jeff King <jeff@mich.com>
Date: Tue, 29 Apr 1997 02:44:29 -0400
To: ss@tapr.org
Message-ID: <2.2.32.19970429064429.00735bfc@mail.mich.com>
Rendered body type: text/plain

At 10:12 PM 4/28/97 -0500, Phil Karn wrote:

>
>So as a goodwill gesture to the satellite and weak signal crowds I'm

Danger Will Robinson.

>Comments?
>
>Phil

I don't make goodwill gestures unless they make technical sense. Most of amateur radio (including the ARRL) doesn't have any vision what-so-ever as to what "amateur radio" could be, just what it has been. I stopped trying to reason with these folks years ago. I'm fully convinced that any growth in amateur radio as a result of SS operations will come from outside the hobby.

Not sure if
this helps you but I do know you'll never make the weak signal/
repeater/10-4 folks happy. So you might as well just make the rules
make sense instead of trying to please people that don't have a
clue as to what the future holds.

I'd fully agree with Greg on this one. We should stand firm on
a reduction of restrictions on SS without regard to those that
have a vested interest to keep the status quo.

Then again, I'm happy to vote Libertarian year after year even
though they never win. Its a decision you have to make yourself.

Regards,

| Jeff King Aero Data Systems |
| jeff@mich.com P.O. Box 510895 |
| (810)471-1787 Livonia, MI 48151 |
F(810)471-0279 United States

69. CDMA on sat

From: "Basuki E. Priyanto" <priya@students.itb.ac.id>
Date: Tue, 29 Apr 1997 15:40:27 +0700 (JVT)
To: Phil Karn <karn@qualcomm.com>
Cc: ss@tapr.org
Message-ID: <Pine.BSI.3.96.970429153435.8485A-100000@students.itb.ac.id>
Rendered body type: text/plain

next year i'll met with final project at my campus
so i want get a topic about :

multiple access CDMA on satellite communication ...

actually i want to build a hardware device (prototype, transceiver ,
etc), i don't know what can i build or what hardware that very necessary ,
because i'm "a new comer" on spread spectrum .

would you like to give me an advice about my final project ?

can you tell me some literature to understand about CDMA , spread spectrum
, etc ?

thanks for everything
:)

Best Regards,
BASUKI E. PRIYANTO
"Beat Spread Spectrum"
Mail:priya@itb.ac.id

70. Looking for Wireless Lan Info

From: Ronen Pinchook <ronen@netmanage.co.il>
Date: Tue, 29 Apr 97 12:27:02 +0200
To: ss@tapr.org
Message-ID: <Chameleon.862306210.ronen@ronen.netmanage.co.il>
Rendered body type: text/plain

Hello
Can someone point me for company that makes a Wireless lan (or Digital Link)
For long range (About 100KM) ????
The Airlan and other SS products Are not Enough Long range for our need
We look for a High Speed (1.2 MB or 2MB or better) Back Bone solution
For about 100KM Range

Please Advice
Ronen

Home of Chameleon , TCP/IP applications for Windows
Ronen Pinchook (4Z4ZQ)
NetManage Israel, Ltd. Phone: 972-4-8550123
E-Mail: ronen@netmanage.co.il Fax: 972-4-8550122
Time sent:04/29/97 12:27:03

71. Re: SS ID

From: andre_kesteloot@juno.com (Andre V Kesteloot)
Date: Tue, 29 Apr 1997 07:25:35 EDT
To: ss@tapr.org
Message-ID: <19970429.072501.10015.36.andre_kesteloot@juno.com>
Rendered body type: text/plain

On Tue, 29 Apr 1997 01:50:12 -0500 (CDT) Jeff King <jeff@mich.com>
writes:
[good stuff deleted...]
>>Then again, I'm happy to vote Libertarian year after year even
>though they never win. Its a decision you have to make yourself.

...which brings back to mind the motto of William of Orange: "Il n'est
pas necessaire d'esperer pour entreprendre, ni de reussir pour
perseverer".

Andre Kesteloot N4ICK.

72. Re: [SS:1292] Looking for Wireless Lan Info

From: Steve Sampson <ssampson@claven.tinker.af.mil>
Date: Tue, 29 Apr 1997 09:36:00 -0500
To: ss@tapr.org
Message-ID: <33660750.59E2@eds.tinker.af.mil>
Rendered body type: text/plain

Ronen Pinchook wrote:

>
> Can someone point me to a company that makes a Wireless lan
> (or Digital Link) for long range (About 100KM)

100 kilometers is a problem. Earth curvature and other
things come into effect (antenna height, etc).

What everyone uses here, is the microwave links. The
two best that I can think of who use these, are the
Bonneville Power Administration (Oregon) and the USAF.
They use 40 mile hops on pretty significant structures.
Neither have anything to do with SS, so I'll drop it here.
But to get 100 kilometers, you are going to have to
go the license route with higher power and structures, or
you will have to have about 10 to 20 intermediate hops
with unlicensed nodes.

Just a guess, no facts.

Steve

73. Re: [SS:1287] SS ID

From: debgm@intouch.com
Date: Tue, 29 Apr 1997 16:33:43 +0200
To: ss@tapr.org
Message-ID: <199704291433.QAA07602@intouch2.intouch.com>
Rendered body type: text/plain

PLEASE NOTE GROEGER NO LONGER HERE, DELETE THIS ADDRESS

DEBGM

At 10:12 PM 4/28/97 -0500, you wrote:

>Hi Guys,

>

>A full-blown debate has erupted in my mailbox over the past full days.
>It started when Bill Tynan posted AMSAT's draft comments to the FCC on
>the SS NPRM, and I was asked for my reaction.

>

>The funny thing about AMSAT's comments is that they were identical to
>Tynan's personal comments (posted a week earlier) with the name simply
>changed. And of course Tynan has either ignored or deliberately
>slanted everything we've said in favor of liberalized SS operation
>while still claiming to be in favor of innovation.

>

>Anyway, some other, more reasonable people have brought up the
>narrowband ID issue. That is, they'd be more willing to accept SS if
>they could find an easy way to identify an interfering signal with
>narrowband equipment. This is a reasonable request.

>

>I don't know if we ever really discussed it here, but I am thinking
>along the following lines.

>

>1. If a SS signal is too weak to cause QRM, there is no need to
>identify it.

>

>2. If a SS signal is strong enough to QRM a narrowband receiver, then
>a narrowband ID of equal power spectral density will be copyable.

>

>3. The absolute last thing you want is to periodically stop your SS
>emission and funnel full power into a narrowband CWID. Even if your SS
>emission didn't bother anybody, such an ID sure could!

>

>So as a goodwill gesture to the satellite and weak signal crowds I'm
>proposing a rule that above a certain power level (TBD) SS
>transmissions would have to be IDed with Morse Code at a power
>spectral density not to exceed that of the SS emission as a whole as
>measured in a 3Khz (SSB) bandwidth.

>

>The rule would allow many different implementations: unbalancing the
>spreading mixer of a DS system slightly to inject a weak carrier
>component that could be keyed on and off; injecting keyed CW tones at
>other RF frequencies; keying a frequency notch out of the spread
>signal (most easily done with fast frequency hopping by simply gating
>the transmitter off when it lands in the notch during a key-up
>interval in the CWID); keying the whole emission off and on (best for
>highly coded low speed emissions where the interleaver could "ride
>through" the keyup intervals). There are probably other methods that
>would work too, and all could be copied in narrowband receivers.

>

>Comments?

>

>Phil

>

>

>

>

74. Re: [SS:1291] CDMA on sat

From: debgm@intouch.com
Date: Tue, 29 Apr 1997 16:34:18 +0200
To: ss@tapr.org
Message-ID: <199704291434.QAA07629@intouch2.intouch.com>
Rendered body type: text/plain

PLEASE NOTE GROEGER NO LONGER HERE, PLEASE DELETE ADDRESS

DEBGM

At 03:44 AM 4/29/97 -0500, you wrote:

```

>
>next year i'll met with final project at my campus
>so i want get a topic about :
>
>multiple access CDMA on satellite communication ...
>
>actually i want to build a hardware device (prototype, transceiver ,
>etc), i don't know what can i build or what hardware that very necessary ,
>because i'm "a new comer" on spread spectrum .
>
>would you like to give me an advice about my final project ?
>
>can you tell me some literature to understand about CDMA , spread spectrum
>, etc ?
>
>thanks for everything
>:)
>
>*****
>Best Regards,
>BASUKI E. PRIYANTO
>"Beat Spread Spectrum"
>Mail:priya@itb.ac.id
>*****
>
>
>

```

75. Re: [SS:1288] Re: SS ID

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From: debgm@intouch.com
Date: Tue, 29 Apr 1997 16:33:59 +0200
To: ss@tapr.org
Message-ID: <199704291433.QAA07613@intouch2.intouch.com>
Rendered body type: text/plain

```

PLEASE NOTE GOREGER NO LONGER HERE, PLEASE DELETE THIS ADDRESS
DEBGM

```

At 11:29 PM 4/28/97 -0500, you wrote:
>>So as a goodwill gesture to the satellite and weak signal crowds I'm
>>proposing a rule that above a certain power level (TBD) SS
>>transmissions would have to be IDed with Morse Code at a power
>>spectral density not to exceed that of the SS emission as a whole as
>>measured in a 3Khz (SSB) bandwidth.
>
>>The rule would allow many different implementations: unbalancing the
>>spreading mixer of a DS system slightly to inject a weak carrier
>>component that could be keyed on and off; injecting keyed CW tones at
>>other RF frequencies; keying a frequency notch out of the spread
>>signal (most easily done with fast frequency hopping by simply gating
>>the transmitter off when it lands in the notch during a key-up
>>interval in the CWID); keying the whole emission off and on (best for
>>highly coded low speed emissions where the interleaver could "ride
>>through" the keyup intervals). There are probably other methods that
>>would work too, and all could be copied in narrowband receivers.
>>
>>Comments?
>
>Why does it not surprise me that Bill's comments are going to be those of
>AMSAT. I hope that you have some influence on the AMSAT Board before the
>filling, but past experience doesn't seem to indicate that much influence
>Bill on this subject. I sent a set of messages to Tom Clark on this issue
>in January which he posted to the AMSAT board. Maybe they are aware of the
>concern I have about the possible damage of poor rules for SS could have on
>future satellite SS operations.
>
>My personal comment is that I couldn't disagree with you more Phil.
>
>At best, RM-8737 and Docet 97-12 were some of the poorest written rule
>making I have seen from the WTB in some time. This is one reason we are
>having these debates on the issues that should be simple in nature.
>
>It comes down to this. Rules that the amateur community gets implemented
>now -- we are going to have to live with for possibly another 10+ years.
>Are we willing to have this IDing issue in the rules for years and years
>that could vastly limit people doing new designs. We need to implement
>rules that are open. We can't have additions to the rules for special
>interests within the hobby, just because they are potentially afraid of new
>technology. Amateur radio changes -- at least it is suppose to if the

```

>rules allows change. The things I keep seeing that could be added when we
>started by trying to simply delete things -- could drastically limit future
>growth. Maybe this is a tactic by those that just want the status quo for
>the next ten years when it might not matter to them who is operating.
>
>Every time a group has an concern with Spread Spectrum someone shows up
>with a fix that concerns power limitations. I have a license that says I
>can operate various power limits. I might as well start tuning up in the
>weak signal band with wide band amps at 1000 watts. Why don't I ? Because
>I know that there are other there and it wouldn't be nice. We should not
>limit the operations of a mode (i.e. second class citizen) all because
>someone is concerned about bad operating. The rules should be written to
>benefit those that operate correctly, not limit it because a few could
>operate poorly. Those are bad rules if we write them to take in account
>the 1% of the community instead of the 99% of the community.
>
>We have rules to handle all the various issues. Having Morse Code IDing is
>the most ridiculous concept I have heard of on a potentially advanced mode
>such as Spread Spectrum. We might as well revert back to just running 300
>baud on HF.
>
>The FCC is ready to allow us the changes we are asking for. If we file
>comments giving into various special interests that want limitations placed
>on the technology, then that gives them credence for the FCC to consider
>during the rules process. We need to ask for all the things we want in the
>rule making -- in-band IDing, 50Mhz and up, no power limitations and the
>rest. This is amateur radio, not a commercial service, not Part 15, not
>anything else.
>
>We are back to adding rules to something we started out trying to simplify
>greatly. This doesn't make sense. Let's stick with deleting rules from
>Part 97 to open them up, not adding more limitations to what amateur can
>design and experiment with as a fun, learning, and educational experience.
>
>It is time to make Part 97 into rules that fit on a few sheets that are
>easy to read instead of something that requires a lawyer with a spectrum
>analyzer to determine if a radio is legal or not.
>
>Now on a technical issue -- what about hybrid systems or other methods that
>people might use ? DS is you example. If I am jumping between bands with
>a hybrid system -- where do I ID ? Each band hope ? On every band ? Just
>on the band I am at when the 10 min ID hits ? Can I ID at 300 wpm ? Again
>-- a simple rule that makes sense on the surface for a few modes of
>operations might not really fit an entire mode called Spread Spectrum.
>This again comes down to being something that is agreed upon when systems
>are being designed, not something defined in the rules.
>
>Cheers - Greg, WD5IVD
>
>-----
>Greg Jones, WD5IVD
>Austin, Texas
>wd5ivd@tapr.org
><http://www.tapr.org/~wd5ivd>
>-----
>
>
>
>

76. Re: [SS:1293] Re: SS ID

From: debgm@intouch.com
Date: Tue, 29 Apr 1997 16:34:41 +0200
To: ss@tapr.org
Message-ID: <199704291434.QAA07649@intouch2.intouch.com>
Rendered body type: text/plain

PLEASE NOTE GROEGER NO LONGER HERE, PLEASE DELETE ADDRESS
DEBGM

At 06:28 AM 4/29/97 -0500, you wrote:
>
>On Tue, 29 Apr 1997 01:50:12 -0500 (CDT) Jeff King <jeff@mich.com>
>writes:
>[good stuff deleted...]
>>>Then again, I'm happy to vote Libertarian year after year even
>>though they never win. Its a decision you have to make yourself.
>
>..which brings back to mind the motto of William of Orange: "Il n'est

>pas necessaire d'esperer pour entreprendre, ni de reussir pour
>perseverer".
>
>Andre Kesteloot N4ICK.
>
>
>

77. Re: [SS:1291] CDMA on sat

From: debgm@intouch.com
Date: Tue, 29 Apr 1997 16:34:26 +0200
To: ss@tapr.org
Message-ID: <199704291434.QAA07636@intouch2.intouch.com>
Rendered body type: text/plain

PLEASE NOTE GROEGER NOT HERE, PLEASE DELETE ADDRESS
DEBGM

At 03:44 AM 4/29/97 -0500, you wrote:
>
>next year i'll met with final project at my campus
>so i want get a topic about :
>
>multiple access CDMA on satellite communication ...
>
>actually i want to build a hardware device (prototype, transceiver ,
>etc), i don't know what can i build or what hardware that very necessary ,
>because i'm "a new comer" on spread spectrum .
>
>would you like to give me an advice about my final project ?
>
>can you tell me some literature to understand about CDMA , spread spectrum
>, etc ?
>
>thanks for everything
>:)
>
>*****
>Best Regards,
>BASUKI E. PRIYANTO
>"Beat Spread Spectrum"
>Mail:priya@itb.ac.id
>*****
>
>
>

78. Re: [SS:1292] Looking for Wireless Lan Info

From: debgm@intouch.com
Date: Tue, 29 Apr 1997 16:34:34 +0200
To: ss@tapr.org
Message-ID: <199704291434.QAA07644@intouch2.intouch.com>
Rendered body type: text/plain

PLEASE NOTE GROEGER NO LONGER HERE, PLEASE DELETE ADDRESS,
DEBGM

At 04:31 AM 4/29/97 -0500, you wrote:
> Hello
>Can someone point me for company that makes a Wireless lan (or Digital Link)
>For long range (About 100KM) ???
>The Airlan and other SS products Are not Enough Long range for our need
>We look for a High Speed (1.2 MB or 2MB or better) Back Bone solution
>For about 100KM Range
> Please Advice
> Ronen
>
>-----
> Home of Chameleon , TCP/IP applications for Windows
>Ronen Pinchook (4Z4ZQ)
>NetManage Israel, Ltd. Phone: 972-4-8550123
>E-Mail: ronen@netmanage.co.il Fax: 972-4-8550122
>Time sent:04/29/97 12:27:03
>-----
>
>
>

79. Re: [SS:1290] Re: SS ID

From: debgm@intouch.com
Date: Tue, 29 Apr 1997 16:34:11 +0200
To: ss@tapr.org
Message-ID: <199704291434.QAA07625@intouch2.intouch.com>
Rendered body type: text/plain

PLEASE NOTE GROEGER NO LONGER HERE, DELETE ADDRESS
DEBGM

At 01:50 AM 4/29/97 -0500, you wrote:

>At 10:12 PM 4/28/97 -0500, Phil Karn wrote:

>

>>

>>So as a goodwill gesture to the satellite and weak signal crowds I'm

>

>Danger Will Robinson.

>

>>Comments?

>>

>>Phil

>

>I don't make goodwill gestures unless they make technical sense. Most
>of amateur radio (including the ARRL) doesn't have any vision what-so-
>ever as to what "amateur radio" could be, just what it has been. I
>stopped trying to reason with these folks years ago. I'm fully convinced
>that any growth in amateur radio as a result of SS operations will come
>from outside the hobby.

>

>Not sure if

>this helps you but I do know you'll never make the weak signal/

>repeater/10-4 folks happy. So you might as well just make the rules

>make sense instead of trying to please people that don't have a

>clue as to what the future holds.

>

>I'd fully agree with Greg on this one. We should stand firm on

>a reduction of restrictions on SS without regard to those that

>have a vested interest to keep the status quo.

>

>Then again, I'm happy to vote Libertarian year after year even

>though they never win. Its a decision you have to make yourself.

>

>

>Regards,

>

>-----

>| Jeff King Aero Data Systems |

>| jeff@mich.com P.O. Box 510895 |

>| (810)471-1787 Livonia, MI 48151 |

>|F(810)471-0279 United States |

>-----

>

>

>

80. Re: [SS:1287] SS ID

From: Jack Taylor <n7oo@goodnet.com>
Date: Tue, 29 Apr 1997 07:44:54 -0700 (MST)
To: ss@tapr.org
Message-ID: <Pine.GS0.3.95.970429074320.21713B-100000@goodguy>
Rendered body type: text/plain

Excellent thoughts, Phil! Would think not just for amateur use, but any
ss operation, some way of quickly determining the ID of an interfering
transmitting station would be desirable.

73 de Jack

81. Re: [SS:1288] Re: SS ID

From: RHS Linux User <fred@tekdata.com>
Date: Tue, 29 Apr 1997 09:53:22 -0500 (CDT)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.970429093445.32596A-100000@tekdata.com>
Rendered body type: text/plain

>

> My personal comment is that I couldn't disagree with you more Phil.

>

> At best, RM-8737 and Docet 97-12 were some of the poorest written rule

> making I have seen from the WTB in some time. This is one reason we are

> having these debates on the issues that should be simple in nature.
 >
 I agree..

>
 > Every time a group has an concern with Spread Spectrum someone shows up
 > with a fix that concerns power limitations. I have a license that says I
 > can operate various power limits. I might as well start tuning up in the
 > weak signal band with wide band amps at 1000 watts. Why don't I ? Because
 > I know that there are other there and it wouldn't be nice. We should not
 > limit the operations of a mode (i.e. second class citizen) all because
 > someone is concerned about bad operating. The rules should be written to
 > benefit those that operate correctly, not limit it because a few could
 > operate poorly. Those are bad rules if we write them to take in account
 > the 1% of the community instead of the 99% of the community.
 >

I agree with this too. I wonder how ridiculous this makes us look to the FCC. I could be wrong, but from strictly a non-technical point -- and this is the rather emotional point I made to Bill -- the same sort of people who will develop SS technology either already operate the satellites (at least occasionally) or have a healthy respect for them.

But instead, AMSAT is acting like the "repeater gods" who think that they should have exclusive of "their" frequencies. Instead of letting good design and free enterprise determine the future of amateur SS, they would rather say, "Not in my backyard". This kind of mentality is REALLY disappointing from a organization technical enough to be able to launch satellites into orbit. This is like if 25 years ago terrestrial operators would have fought ham sats because they might interfere with terrestrial operations!

So basically what AMSAT and W3XO is telling us, and Bill actually told me in a personal e-mail correspondence is that they don't trust all of us. Maybe me, maybe Phil because we are degreed engineers, but maybe not someone who just buys a TAPR kit, or "exploitive" commercial ham manufacturers. Does MFJ really exploit the ham community? or Kenwood?

I don't know about anyone else out there- I am now a member of the ARRL because I was happy about their support of SS (even with the rules not being too clear on SS, and despite my anti-forced-CW stance), a member of TAPR (because I feel overall they are heading in the right direction) and also AMSAT.

I've always supported AMSAT, I like the _Journal_, but I'm worried about the "all eggs in one basket" philosophy with P3D and now I'm downright hot about the SS issue. Maybe it's time I let that particular \$30/yr stay in my checkbook..

Fred M. Spinner, KA9VAW
 fred@tekdata.com

82. Re: [SS:1289] Re: SS ID

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
 Date: Tue, 29 Apr 1997 10:15:03 -0500
 To: ss@tapr.org
 Message-ID: <v0302090eaf8bc0486129@[208.134.134.40]>
 Rendered body type: text/plain

Phil, I read back over my hastily written message and kept wondering what the correct term would be for what I was calling in-band IDing or what I think of as having the ID in the data stream.

Would it be called in-band IDing? or would there be a more practical term used in industry for this that I am not familiar with ?

Cheers - Greg

>Okay Greg, you've convinced me. The rules should be as liberal as possible,
 >and we should rely on "best current practice" to set standards for ID,
 >etc.
 >
 >Automatic power control and CWIDs should probably be on the list of
 >"best current practice". BTW, the CWID really isn't that hard to
 >implement, and by the very nature of spread spectrum it wouldn't
 >bother the spread signal. But I agree there could be situations where
 >it's not totally trivial.
 >
 >Phil

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd

83. Re: [SS:1294] Re: Looking for Wireless Lan Info

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Tue, 29 Apr 1997 11:05:17 -0500
To: ss@tapr.org
Message-ID: <v03020918af8bca73c582@208.134.134.40>
Rendered body type: text/plain

>Ronen Pinchhook wrote:
>>
>> Can someone point me to a company that makes a Wireless lan
>> (or Digital Link) for long range (About 100KM)
>
>100 kilometers is a problem. Earth curvature and other
>things come into effect (antenna height, etc).
>
>What everyone uses here, is the microwave links. The
>two best that I can think of who use these, are the
>Bonneville Power Administration (Oregon) and the USAF.
>They use 40 mile hops on pretty significant structures.
>Neither have anything to do with SS, so I'll drop it here.
>But to get 100 kilometers, you are going to have to
>go the license route with higher power and structures, or
>you will have to have about 10 to 20 intermediate hops
>with unlicensed nodes.
>
>Just a guess, no facts.
>

Not necessarily, there are projects like Signatron and others that are working on this type of technology.

Ronen, two questions that have to be asked, are you limited to a freq band of operations and speed ? If you want high data rates on higher bands you are not going to see it happen in one hop. If you want a lower speed on a lower band the technology might be available now and in the future.

Amateur radio operators makes 60 miles work on 440 and other freqs at 9600 and probably even 56K with antennas at 80feet running power of 35watts, but making it work does require height between your locations at the antenna, the use of gain antennas, enough power ot make the stuff talk to each other, and no mountains in the way. Freq selection, height of antenna, transmission power, and several other factors effect making something go 60 miles (100km). Are there any major terrain features in the way ? I would think that at worse you are talking about two 30 mile hops if they are both line of sight. 30 miles is do able now with some of the commercial equipment available in the US and elsewhere if installed and setup correctly for what you are trying to do.

The issues of making radios work over distance is complex, but sometime it is the only alternative.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd

84. Re: [SS:1303] Re: SS ID

From: Steve Sampson <ssampson@claven.tinker.af.mil>
Date: Tue, 29 Apr 1997 13:19:53 -0500
To: ss@tapr.org
Message-ID: <33663BC9.1CFB@eds.tinker.af.mil>
Rendered body type: text/plain

I've read interesting engineering stories, where an RFI problem was investigated, and the source identified.

One really good one, was an old barn that had a tin roof,

and some other metals, that began arcing in every storm.
It completely wiped-out the HF bands for several miles.

It would come and go, but finally it was tracked down.

The moral of the story, is it did not have a CW ID.

So the argument has to be a "fast method of identification."
In short, a burst of information, easily decoded. It
does not need to be morse. If a decoder can be built for
\$25 that allows anyone to display what callsigns are using
the spectrum, then use that as a compromise. Let's not
focus on narrowband morse code. There are many ways to
ID, and let's compromise with the highest-tech solution.

Who's working on high-tech radio identification? I'm sure
the FCC needs a solution in the commercial realm.

Steve

85. Re: [SS:1306] Re: SS ID

From: "Alan J. Eynon" <aeynon@micro.ti.com>
Date: Tue, 29 Apr 1997 14:20:34 -0500
To: ss@tapr.org
Message-ID: <3.0.32.19970429142033.006c8184@pcmail.micro.ti.com>
Rendered body type: text/plain

>The moral of the story, is it did not have a CW ID.

An excellent idea!

>So the argument has to be a "fast method of identification."
>In short, a burst of information, easily decoded. It
>does not need to be morse. If a decoder can be built for
>\$25 that allows anyone to display what callsigns are using
>the spectrum, then use that as a compromise. Let's not
>focus on narrowband morse code. There are many ways to
>ID, and let's compromise with the highest-tech solution.

I don't suppose we could settle for something subtle like the
spreading sequence itself? For instance, using two 10-stage
shift registers (presumably hard-wired with the preferred pair
of tabs), it's possible to generate 1025 unique Gold code
spreading sequences, essentially by changing the starting fills
of the two shift registers. Longer shift registers produce
correspondingly larger families of sequences (with generally
good cross-correlation properties, I might add). It seems
like if the FCC wanted to regulate the use of spread spectrum,
it could do so by giving each of us a unique set of fills.
This also has the by-product that it makes identification easy.
It also requires zero extra hardware on our part. Additionally,
it forces us to standardize on a fixed set of shift register
taps, which (for DS at least) might aid interoperability.

One might argue that by changing fills a truly perverse
individual could masquerade as someone else, but then that's
just as true of any other form of identification. In fact,
a CW or other narrowband form of superimposed ID (being more
familiar) might even be easier to corrupt.

I don't know; how esoteric can we go before we break the FCC's
threshold of tolerance?

73,
Alan
N3IRL/GØPTH

Software Development Systems, Stafford, Texas Instruments, +1 281-274-2943

"DESTROY 99% OF KNOWN HOUSEHOLD PESTS WITH PRE-SLICED, RUSTPROOF, EASY
TO HANDLE, LOW CALORIE SIMPSON'S INDIVIDUAL EMPEROR STRINGETTES, FREE
FROM ARTIFICIAL COLORING (AS USED IN HOSPITALS)." -- Monty Python

86. Re: [SS:1294] Re: Looking for Wireless Lan Info

From: Jerry Normandin <jerryn@ici.net>
Date: Tue, 29 Apr 1997 15:20:30 -0400
To: ss@tapr.org

Message-ID: <336649FE.712D8CF2@ici.net>
Rendered body type: text/plain

Jerry Replies:

Wow 40 miles is a long microwave hope. Those towers must be HUGE!
I am getting 26miles out of 100' anteneea hieght and 1 watt out.
Note: I am using a high gain preamp and a phased array antennea!

Steve Sampson wrote:

>
> Ronen Pinchook wrote:
> >
> > Can someone point me to a company that makes a Wireless lan
> > (or Digital Link) for long range (About 100KM)
>
> 100 kilometers is a problem. Earth curvature and other
> things come into effect (antenna height, etc).
>
> What everyone uses here, is the microwave links. The
> two best that I can think of who use these, are the
> Bonneville Power Administration (Oregon) and the USAF.
> They use 40 mile hops on pretty significant structures.
> Neither have anything to do with SS, so I'll drop it here.
> But to get 100 kilometers, you are going to have to
> go the license route with higher power and structures, or
> you will have to have about 10 to 20 intermediate hops
> with unlicensed nodes.
>
> Just a guess, no facts.
>
> Steve

87. Re: Microwave lan for 100 KM

From: Pinchook Ronen <ronen@ronen.netmanage.co.il>
Date: Tue, 29 Apr 97 23:33:34 EDT
To: ss@tapr.org
Message-ID: <202475@ronen.netmanage.co.il>
Rendered body type: text/plain

Let me ask for question

All these link I see With Dishes (for example the one that connect between the cellular towers , TV station etc)

Dont designed for more then 40-60 Mile ??? (hard for me to belive)

If we calculate line of sight losses in 2.4G

It can be achived very simply with not so big dish and not so high power

Thats What I look for ...

Yes , I have Places With mountains 100KM apart line of sight So Only I need
that the losses will not be too much

or that the power will be strong enough to overcome the path loss

We have now from the same places a 9.6K Back Bone

Running with a Omnidirectional (in one side) to Beem (at other side)

with 5 Watt power (yes thats truth) and it works full scale no problem)

Iit work on the UHF band (433 MHz)

I want to Upgrade the Speed to more then 56K

I can also tell you that I can hear the 800 MHz Trunking station at hifa
from Mobile at Tel-aviv (100KM away) and the trunk use 25Watt

So I dont Understand Why cant it be done with Fixed station With Beem
on 2.4Ghz

I'm looking for that type of radios that will doo the job for me.

Please Advice
Thanks Forward
Ronen - 4Z4ZQ

Jerry Replies:

Wow 40 miles is a long microwave hope. Those towers must be HUGE!

I am getting 26miles out of 100' anteneea hieght and 1 watt out.

Note: I am using a high gain preamp and a phased array antennea!

Steve Sampson wrote:

>

> Ronen Pinchook wrote:

> >

> > Can someone point me to a company that makes a Wireless lan

> > (or Digital Link) for long range (About 100KM)

>

> 100 kilometers is a problem. Earth curvature and other

> things come into effect (antenna height, etc).

>

> What everyone uses here, is the microwave links. The

> two best that I can think of who use these, are the

> Bonneville Power Administration (Oregon) and the USAF.

> They use 40 mile hops on pretty significant structures.

> Neither have anything to do with SS, so I'll drop it here.

> But to get 100 kilometers, you are going to have to

> go the license route with higher power and structures, or

> you will have to have about 10 to 20 intermediate hops

> with unlicensed nodes.

>

> Just a guess, no facts.

>

> Steve

88. Re: [SS:1304] Re: SS ID

From: Tony McConnell <n3jly@erols.com>
Date: Tue, 29 Apr 1997 16:54:09 -0400
To: ss@tapr.org
Message-ID: <199704292054.QAA09729@smtp1.erols.com>
Rendered body type: text/plain

At 11:15 AM 4/29/97 -0500, you wrote:
>Phil, I read back over my hastily written message and kept wondering what
>the correct term would be for what I was calling in-band IDing or what I
>think of as having the ID in the data stream.
>
>Would it be called in-band IDing? or would there be a more practical term
>used in industry for this that I am not familiar with?
>
>Cheers - Greg

yes in-band iding would be iding in the data payload, as with packet now.

in a way a narrow band id makes less sense than a wide one. from the
prospective
of the narrow band user, he can't be sure that the id he can hear is the wide
signal that is making him misserable.

how about a continous morse or mcw of the carrier amplitude while in use? say
50%. detectable with a narrow receiver, and wide so that the the id is where
the supposed intereference is. but any narrow slow id becomes silly with the
sort of transmissions that will likely the the use of these radios.

tony - n3jli

89. Re: [SS:1307] Re: SS ID

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Tue, 29 Apr 1997 16:58:50 -0400 (EDT)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.970429165232.6837B-100000@uhf.wdc.net>
Rendered body type: text/plain

[...]

> it could do so by giving each of us a unique set of fills.
> This also has the by-product that it makes identification easy.
> It also requires zero extra hardware on our part. Additionally,
> it forces us to standardize on a fixed set of shift register
> taps, which (for DS at least) might aid interoperability.

The general concept sounds great, however this brings to mind something akin to the what power hungry frequency coordinators are doing right now in the frequency domain (I know I am exaggerating a bit, but someone will have to do the paper work for registering the spreading codes).

Also, how do you propose to identify what spreading code a particular station is using by listening to it with nothing more than a narrowband receiver?

> I don't know; how esoteric can we go before we break the FCC's
> threshold of tolerance?
>

I don't know either. Nonetheless the current rules with narrowband ID'ing is pretty silly.

Bernie

90. Re: [SS:1309] Re: Microwave lan for 100 KM

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Tue, 29 Apr 1997 16:46:53 -0500
To: ss@tapr.org
Message-ID: <v03020906af8c1c5d029c@[208.134.134.40]>
Rendered body type: text/plain

You should talk to BreezeCom. They are in you country and might be willing to work with you on what you are doing.

Cheers - Greg

>Let me ask for question
>All these link I see With Dishes (for example the one that connect between
>the cellular
>towers , TV station etc)
>Dont designed for more then 40-60 Mile ??? (hard for me to belive)
>If we calculate line of sight losses in 2.4G
>It can be achieved very simply with not so big dish and not so high power
>Thats What I look for ...
>Yes , I have Places With mountains 100KM apart line of sight So Only I need
>that the losses will not be too much
>or that the power will be strong enough to overcome the path loss
>We have now from the same places a 9.6K Back Bone
>Running with a Omnidirectional (in one side) to Beem (at other side)
>with 5 Watt power (yes thats truth) and it works full scale no problem)
>Iit work on the UHF band (433 MHz)
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>

>I can also tell you that I can hear the 800 MHz Trunking station at hifa
>from Mobile at Tel-aviv (100KM away) and the trunk use 25Watt
>So I dont Understand Why cant it be done with Fixed station With Beem
>on 2.4Ghz
>I'm looking for that type of radios that will doo the job for me.

>
> Please Advice
> Thanks Forward
> Ronen - 4Z4ZQ
>-----

>
>Jerry Replies:

>
>Wow 40 miles is a long microwave hope. Those towers must be HUGE!
>
>I am getting 26miles out of 100' anteneea hieght and 1 watt out.
>
>Note: I am using a high gain preamp and a phased array antennea!
>
>Steve Sampson wrote:

```

>
>>
>
>> Ronen Pinchook wrote:
>>
>
>
>> >
>
>> > Can someone point me to a company that makes a Wireless lan
>
>> > (or Digital Link) for long range (About 100KM)
>
>>
>
>> 100 kilometers is a problem. Earth curvature and other
>
>> things come into effect (antenna height, etc).
>
>>
>
>> What everyone uses here, is the microwave links. The
>
>> two best that I can think of who use these, are the
>
>> Bonneville Power Administration (Oregon) and the USAF.
>
>> They use 40 mile hops on pretty significant structures.
>
>> Neither have anything to do with SS, so I'll drop it here.
>
>> But to get 100 kilometers, you are going to have to
>
>> go the license route with higher power and structures, or
>
>> you will have to have about 10 to 20 intermediate hops
>
>> with unlicensed nodes.
>
>>
>
>> Just a guess, no facts.
>
>>
>
>> Steve
>

```

```

-----
Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

```

91. Re: [SS:1311] Re: SS ID

```

From: "Alan J. Eynon" <aeynon@micro.ti.com>
Date: Tue, 29 Apr 1997 17:04:41 -0500
To: ss@tapr.org
Message-ID: <3.0.32.19970429170440.006ca664@pcmail.micro.ti.com>
Rendered body type: text/plain

```

```

>[...]
>> it could do so by giving each of us a unique set of fills.
>> This also has the by-product that it makes identification easy.
>> It also requires zero extra hardware on our part. Additionally,
>> it forces us to standardize on a fixed set of shift register
>> taps, which (for DS at least) might aid interoperability.
>

```

```

>The general concept sounds great, however this brings to mind something
>akin to the what power hungry frequency coordinators are doing right now
>in the frequency domain (I know I am exaggerating a bit, but someone will
>have to do the paper work for registering the spreading codes).

```

Hmmm, in the context of my proposal, I believe that every ham's spreading sequence fills should be public domain. Put 'em on a web page. No, better yet, let us check them out from a web page. The paper-lovers can always follow up authenticating the fill requests by mail. I presume that no

amateur would need more than a handful (?) of sequences.

This might even sooth the operators in whose bands we're proposing to overlay, since they could find out (at a browse) who in their area was using spread spectrum. Depending on location, this - followed up with a few telephone calls - might be enough to determine which spread spectrum transmitter is causing the perceived interference.

I also assume that, prior to prosecuting egregious violators, the FCC or local coordinators will have to do the normal direction finding jig and positively identify the source of the interference. Proof of guilt still rests with the prosecution.

>Also, how do you propose to identify what spreading code a particular
>station is using by listening to it with nothing more than a narrowband
>receiver?

The only limit within which I was operating was that a relatively inexpensive (\$25 was mentioned) device would be all that's needed to make the identification. It seems reasonable that the silicon is already out there (companies like Qualcomm) to brute-force search through the spreading sequence family in a few seconds. Coupled with knowledge of the legitimate operators who have spreading sequences (from that web page I mentioned) and the usual DF fixes, I don't see that enforcement of spread spectrum transmission regulations need be any more difficult than in the narrowband regime. After all, if the spread signal is so stealthy that you can't DF it, then it pretty much goes without saying that it's not causing interference.

Alan

Software Development Systems, Stafford, Texas Instruments, +1 281-274-2943

"DESTROY 99% OF KNOWN HOUSEHOLD PESTS WITH PRE-SLICED, RUSTPROOF, EASY
TO HANDLE, LOW CALORIE SIMPSON'S INDIVIDUAL EMPEROR STRINGETTES, FREE
FROM ARTIFICIAL COLORING (AS USED IN HOSPITALS)." -- Monty Python

92. Re: [SS:1278] Reed Solomon source code

From: Phil Karn <karn@qualcomm.com>
Date: Tue, 29 Apr 1997 16:17:34 -0700 (PDT)
To: ss@tapr.org
Message-ID: <199704292317.QAA15564@servo.qualcomm.com>
Rendered body type: text/plain

>One of my problems, is that none of the 10 books I have on the subject
>give you an algorithms (pseudocode) presentation of Reed Solomon (they
>all explain it over GF() and that's where they lose me. It would

Bernie,

Unfortunately, there is just no way you can really understand the Reed-Solomon code without understanding arithmetic in finite fields (Galois fields). It's a bit like trying to understand orbital mechanics without knowing trigonometry.

I hope my implementation of the RS code in C (which I didn't write from scratch, but merely cleaned up from two other guys) will be of help. But again, the details it won't make much sense unless you have a good understanding of Galois Field arithmetic.

Phil

93. Re: SS ID

From: Lyle Johnson <lylej@azstarnet.com>
Date: Tue, 29 Apr 1997 18:17:26 -0700
To: ss@tapr.org
Message-ID: <3.0.32.19970429180909.006faea4@pop.azstarnet.com>
Rendered body type: text/plain

I might as well jump in and show my ignorance :-)

I remember when we were facing having to send a CWID in the early days of packet. TAPR's early *system* design called for a station on the "net" to broadcast a message to all TNCs in its "domain" to "...5..4..3..2..1..ID..NOW!" and *ALL* the TNCs would then key up and ID in CW at 20 WPM. This would meet the regulatory requirements, would minimize the communications bandwidth hit, and would point out how ridiculous the requirement was :-)

Seems to me that if SS is a recognized mode, IDing in SS is legitimate. We do it on packet, we do it on RTTY, we do it on AMTOR, we even do it on SSB and FM! Anyone feel a need to use CWID on SSB (after all, you might be speaking non-English to the other station)?

I think the new rules ought to be as simple and non-restrictive as possible. Good engineering practice and sound system design will be required to make this mode have a reasonable chance at general acceptance. Power control where it makes sense will happen because it makes sense.

Stations will ID because (a) they have to comply with rules and (b) how else will you know who the other station is? If hams can figure out the other station's ID to exchange information with that station, then the problem is solved, no?

Frankly, I'd like to see the rules say "these bands" and "this maximum overall power" and *perhaps* "this minimum theoretical spreading gain" and "maximum spectral power density" and stop there.

Why make it hard, or assume only SS users will wear black hats?

Back to RUDAK,

Lyle

94. Re: [SS:1314] Re: Reed Solomon source code

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Tue, 29 Apr 1997 21:31:26 -0400 (EDT)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.970429211555.7711B-100000@uhf.wdc.net>
Rendered body type: text/plain

Hi Phil:

> Unfortunately, there is just no way you can really understand the
> Reed-Solomon code without understanding arithmetic in finite fields
> (Galois fields). It's a bit like trying to understand orbital mechanics
> without knowing trigonometry.

I agree 110% Still working on that, but the report has to be done before I fully understand GF().

> I hope my implementation of the RS code in C (which I didn't write from
> scratch, but merely cleaned up from two other guys) will be of help.

Don't we all? :) If worse comes to worse, I'll use it as a black box, but I want to understand the details.

> But again, the details it won't make much sense unless you have a good
> understanding of Galois Field arithmetic.
>

At the risk of asking a really dumb question, but is it possible to explain Reed-Solomon in terms of prime fields and not GF()? All 10 of my books on this subject talk about RS over GF().

Thanks again.

Bernie

95. Re: [SS:1306] Re: SS ID

From: Don Labriola <labriola@ix.netcom.com>
Date: Tue, 29 Apr 1997 07:22:51 -0700
To: ss@tapr.org
Message-ID: <3366043B.35E8@ix.netcom.com>
Rendered body type: text/plain

Just a thought: If the power already has to be controlled, why not increase the power to ID in CW, etc... If this is infrequent (every 10 minutes), then it would not appreciably add to the general noise, but it might be easier to locate the source as the ID would come into the "victim" system in the same manner as the normal signal. An 'inband' ID or omitted hop might not interfere in the same manner as the normal signal, and thus it would still be hard to find the source of problems.

Just my \$.02
73's de W6QS

96. Re: [SS:1316] Re: Reed Solomon source code

From: Phil Karn <karn@qualcomm.com>
Date: Tue, 29 Apr 1997 19:28:17 -0700 (PDT)
To: ss@tapr.org
Message-ID: <199704300228.TAA15923@servo.qualcomm.com>
Rendered body type: text/plain

Well, prime fields are just one type of Galois field. The more general type of Galois field, and the one used in RS codes, is the "extension" field of the form $GF(p^m)$, where p is prime. Most often, $p=2$ (which is prime). This is a natural match to binary computers that group binary bits into words. E.g., $GF(2^8)$ is a natural for a byte-oriented machine, which is why this one value is probably used for more real RS implementations than all others combined.

One problem with prime fields for RS coding applications is that they're not particularly well suited to binary arithmetic. Each code symbol would have a prime number of valid values, meaning not all possible values of a N -bit word would be valid symbols. So you'd have to pick some usable number of bits such that 2^N is less than the size of the prime field, and waste some of the possible values of each symbol.

Not only that, but it's actually much *easier* to implement a code in an extension field such as $GF(256)$ instead of a prime field. Prime fields have the pedagogical (teaching) advantage that addition and multiplication in the field are just like ordinary addition and multiplication done modulo the size of the field. But multiplication is a slow operation, and even addition is more complicated than XOR.

The analogous operations to addition and multiplication in binary extension fields are much easier to implement, with a twist. Addition is downright trivial -- it's simple exclusive OR. So is subtraction, so adding and subtracting are the same operation -- and can often be cancelled out from the formulas. The twist is that the easiest way to multiply two numbers is to add their logarithms with ordinary arithmetic addition.

So you'll see all though my RS code conversions between "polynomial" and "index" (logarithmic) form. Whenever you want to add (or subtract) two GF elements, you convert them to polynomial form (if necessary) with a lookup table and then XOR them. If you want to multiply two elements, you convert them to index (log) form, if necessary, with a complementary lookup table and then add them mod the size of the field.

Some RS implementations dispense with index/log form and keep everything in polynomial form. They perform multiplication and exponentiation (which is just repeated multiplication) with lookup tables. This is a good idea for small field sizes. The problem here is that the tables can get rather big when the GF is large. E.g., for $GF(256)$, a very common choice for a RS code, you need a multiplication lookup table of the form

```
unsigned char gfmult[256][256];
```

You index the table with the two values you want to multiply and the indexed value is the product. The problem is that this is a 64KB table. That's not much RAM by today's standards to be sure, but remember that this thing is going to be competing heavily for on-chip cache space along with everything else the program is doing. So my implementation stuck with the dual polynomial/index representation and a pair of 256-byte lookup conversion tables, which fit nicely into the Pentium cache.

Phil

97. Re: [SS:1313] Re: SS ID

From: Tony McConnell <n3jly@erols.com>
Date: Tue, 29 Apr 1997 23:09:15 -0400
To: ss@tapr.org
Cc: frussle@erols.com
Message-ID: <199704300309.XAA06307@smtp3.erols.com>
Rendered body type: text/plain

At 05:08 PM 4/29/97 -0500, you wrote:

Additionally,
>>> it forces us to standardize on a fixed set of shift register
>>> taps, which (for DS at least) might aid interoperability.
>>

>>The general concept sounds great, however this brings to mind something
>>akin to the what power hungry frequency coordinators are doing right now
>>in the frequency domain (I know I am exaggerating a bit, but someone will
>>have to do the paper work for registering the spreading codes).
>
>Hmmm, in the context of my proposal, I believe that every ham's spreading
>sequence fills should be public domain. Put 'em on a web page. No, better
>yet, let us check them out from a web page.

Remember guys, if everyone has a different spreading code you need that
unique code to hear them, fine for dedicated or point to point stuff, but
otherwise.... eh.

and the idea that it is easy to see something on the air and that it is
easy and quick to brute force through to the pn... i don't think so.
while any of us know that ss does not totally protect a signal from
interception,
without real equipment(read big bucks) it is not easy and quick(ask
Phil, looking at where he works, he has a good idea how likely we
would be at decerning p/n codes off the air).

while it's seems likely we need more codes to use, an assigned codes would
be an impediment. it would be good for us to be free to use unique codes,
i wouldn't want to be forced to.

if we remain stuck with the current rules, amplitude modulate the whole
envelope. but wow what a silly idea. but not quite as silly as unique codes.

98. Re: [SS:1292] Looking for Wireless Lan Info

From: "Basuki E. Priyanto" <priya@students.itb.ac.id>
Date: Wed, 30 Apr 1997 10:19:50 +0700 (JVT)
To: ss@tapr.org
Message-ID: <Pine.BSI.3.96.970430101314.24090E-100000@students.itb.ac.id>
Rendered body type: text/plain

i think there is imposibble to built line of sight communication (LOS)
for 100 km ...
it can be but you must built very high tower
path loss is not a little about 40dB .. you have to increase fading margin

in this case, increase antenna gain , or increase transmitter power

maybe i can give you a suggest from my experience :

my site have digital communication with long range (200km) ,
but it uses 2 repeater between my site and the destination so distance
from my site to repeater about 60 km

it's high speed communication (T1) -> 2 Mbps

maybe my experience can help you ...

On Tue, 29 Apr 1997, Ronen Pinchook wrote:

```
>
> Hello
> Can someone point me for company that makes a Wireless lan (or Digital Link)
> For long range (About 100KM) ???
> The Airlan and other SS products Are not Enough Long range for our need
> We look for a High Speed (1.2 MB or 2MB or better) Back Bone solution
> For about 100KM Range
>
> Please Advice
> Ronen
>
> -----
> Home of Chameleon , TCP/IP applications for Windows
> Ronen Pinchook (4Z4ZQ)
> NetManage Israel, Ltd. Phone: 972-4-8550123
> E-Mail: ronen@netmanage.co.il Fax: 972-4-8550122
> Time sent:04/29/97 12:27:03
> -----
>
>
```

```
*****
Best Regards,
BASUKI E. PRIYANTO
"Beat Spread Spectrum"
Mail:priya@itb.ac.id
*****
```

99. TAPR STA Request for Renewal and Activity Report

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Tue, 29 Apr 1997 23:04:33 -0500
To: " Spread Spectrum "<ss@tapr.org>,
"TAPR-BB list mailing"<tapr-bb@tapr.org>
Message-ID: <v03020914af8c734f764f@[208.134.134.40]>
Rendered body type: text/plain

We just put up the STA Activity Report (all 75 pages) and request for renewal letter both submitted to the FCC yesterday (April 28th, 1997).

Check http://www.tapr.org/ss/tapr_sta.html

We will post something here as soon as we hear about the renewal request.

Keep an eye on <http://www.tapr.org/ss> in May as comments from the upcoming Docket 97-12 first comment period are made available.

Cheers - Greg, WD5IVD

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

100. Re: [SS:1315] Re: SS ID

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Wed, 30 Apr 1997 04:23:53 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199704300423.EAA15500@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

Lyle Johnson <lylej@azstarnet.com> wrote:

> Seems to me that if SS is a recognized mode, IDing in SS is legitimate. We
> do it on packet, we do it on RTTY, we do it on AMTOR, we even do it on SSB
> and FM! Anyone feel a need to use CWID on SSB (after all, you might be
> speaking non-English to the other station)?

Just so. This is how it is in Canada - you ID in the mode you're using, whether it's SS or anything else. I don't think it's necessary to make all signals on the amateur bands identifiable by casual intercept with a narrowband receiver. Besides, many hams aren't even capable of decoding a CWID. :-) It does make good sense, however, for those experimenting with SS to be open about what they are doing, and to offer assistance to the other users of the bands to help identify and deal with suspected interference problems.

Barry (SS enthusiast who can still copy 35 wpm cw... :-)

--

Barry McLarnon VE3JF/VA3TCP	Internet: bm@hydra.carleton.ca
Ottawa Amateur Radio Club	AMPRnet: bm@lynx.ve3jf.ampr.org
Packet Working Group	Web: http://hydra.carleton.ca

101. RE: 1315] Re: SS ID

From: Gwyn Reedy <gwyn@paccomm.com>
Date: Wed, 30 Apr 1997 06:56:47 -0400
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BC5533.AC9573E0@gwyn>
Rendered body type: text/plain

Lyle Johnson[SMTP:lylej@azstarnet.com]said:

> I remember when we were facing having to send a CWID in the early days of
> packet. TAPR's early *system* design called for a station on the "net"
to
> broadcast a message to all TNCs in its "domain" to
> "...5..4..3..2..1..ID..NOW!" and *ALL* the TNCs would then key up and ID
in
> CW at 20 WPM. This would meet the regulatory requirements, would minimize
> the communications bandwidth hit, and would point out how ridiculous the
> requirement was :-)

That is sort of what goes on in the UK, I'm told. They remain under a requirement to use CWID, so everyone sets it to go off at 30 minutes after the hour. Given the limited accuracy of TNC clocks, they lose about a 2-3

minute slot each hour, but then are done with it. Does no one any good, but fills the regulatory square.

```
begin 600 WINMAIL.DAT
M>)\^(C *0:0" ` $`~~~~~!`$`0>0!@` (~~~~Y 0`~~~~~#H`$`(@ <`
M&`~~`$E032Y-:6-R;W-09G0@36%I;"Y.;W1E`#$(`0V !`~~~~~@`~~`$ $
MD 8`]~~~~~$~~~~~P~~, (~~~~+~~\~~~~~(!_P\!~~~~~0~~~~~
M`~~"!*Q^D0J,0&9UN`-T!#U0"~~~~~'-S0'1A<'(N;W)G`%-5%`<W-`=&%P
M<BY0<F<~~~~~'@", $~~~~%~~~~4TU44`~~~~~>~,P`0~~~~P~~~~!S<T!T
M87!R+F]R9P`#`!4,`0~~~~~`_@&~~~~~@`!, $~~~~~)W-S0'1A<'(N
M;W)G)P`~~~~~(!"S !~~~~~$0`~-5% Z4U- 5$%04BY/4D<~~~~~P`~.0`~
M~~~~~+ $ Z`0`~~~~~(!]@!~~~~~!~~~~~(Y) $ $@ $`%`~~~~~).B Q,$ $U
M72!293H@4U,@240`G 0!!8 #`~X`~`#-!P0`'@`&`#@`+P`#`&8!`2" `P`.
M`~~`S0<$`!X!`!@`T`~`~`P!`~~`0$)@` $` (0`~`#-&,$A$0T1",3%"140P,3$X
M14$T,# T,# U,D9&135!`$(`0.0!@#X!`~~`$@`~~~~L` (P`~~~~~P`F`~~~~
M`~~~+`"D`~~~~~+`@`~~~~~P`V`~~~~~!`#D`@.#, ,E550 $>`~`~`0`~
M`!0`~~!213H@,3,Q-5T@4F4Z(%-3($E$`~`(!<0`!~~~~~%~~~~~&554RS-0<
M&$`~`^$1`0CJ0`0 40_EH`~`~`!A"+I:~`<P`'$X`~`~`>`@0`0`~`&4`~`!,
M64Q%2D] (3E-3E--5% Z3E,14I 05I35$%23D540T] -4T%)1#I)4D5-14U"
M15)72$5.5T5715)%1D%#24Y'2$%624Y'5$]314Y$04-7241)3E1(145!4DQ9
M1$%94T] &4$%#`~~~~~(!"1 !~~~~~IO,~~`$#`~~`R!@`~`3I&=9R;+W#`~`H!
M#P(5`J0#Y 7K`H,`4!,#5 ( `8V@*P`-E=.XR!@`&PP*#,@/&!Q,"@85`~`4"
M`~!R<1(@$XBZ-!,-?0J " ,\ )V3L7CW@R-34"@ J!#;$+8&XP9S$P,Q00@`P-L
M:0@Q.# "T6DM,32>- WP#- ;\PM9,38*H T#8'0%D 5 3'EL93 @2F]H` ( "
M(%M3($U44#IL'B%J0+AA>G,!D 2@$@`N!;!<;5T+1A0B#`%C`$ @\G,+<&0Z
M"H<<SQW2"H09&U S-AR7(/D^(E<2\O,,`1V622 7D > !M $D/@@=V@)\`"A0
M'D HL!>03`~`F`- +@&<@<$<V&2EB=&\AD GP9"!AP"!#STE$( N *@`9*` @
M90K `S @9&`R>00@;V8A_25_)H\%0 D*L&-K( $@(%1!F%!2)P0*W0J<ROP
MFIW ;2HKP >0:6<#H/YC!T >,"IP`A %P"J0'[%<=&D("P0*Q0B'_`_B+RH!
M+$\M7RY08@-@863? , = ?L"J!$X$AH&<>0"H1,S'A+!_!0P0*P*I=/D$(")D
M`W$+@#/?-.\U Z$=TB(N+C4]H#0]H.HS/: R/: Q/: JT#V@<$Y/5R$Z( !P
M*G JN$%,3#% *S(X\W<(8#YL*G K,0.@+Z KL'5P_S]#*M,Z;SM_/(\JL"J
M!4"A"= @5U!-+])H! #?0'4'@!(`*R,7D&<+8"H0QG(KL!>0<75I)](",!QS
M+$:6`X '<&EZ99]' /T-/1%K,B Q;74#`+<QT#>2!"!B/U$#\&0K.)ID#EP
M2/ _4D"$<&\+@&<%0 A@!4!H;P?@!1!D_TW 0* (8 0@*$S$CWR302V\/)PE(
M.2A0-Z @.BTI_U+/(8 CQ@J/((Q&4$611G&?'J `("P1*%$%D6=0!Y$3,0$K
M!55+2!/)VW_*@% L" _01E!!02?1"W%!8/\J8"@Q*I!5BBH144 >0"JRUTCP
M!J K8'8$0'D"(!Y ?Q'Q.2%?4UN@+!%;,$61,^)%T$EQ4% 'D6$!@`Q*$+G
M4( (<_"_01VE@@"L4&U#727 =P"IQ8U$`<@#0*[_#_6R$X\3' %R OD$CA*$S$K
ML!\7(%^Q`!:!00BJ0,BT5_V)U(9 7( 5 *W 1L&.32/#8E!10.,*P!Y .<!@
MT0/PUT[!7 OT$1;LFYAP6#1_P!P*!;H 1P:50;P#`P45.W1X) H$?4<TA0
M:@$N5_P+6&46L0!P$`~~~~~$!`~~~~~P`1$`~~~~~!`~<P@&L"D5150 %
I`~@P@&L"D5150 $>`#T`~`0`~`~`4`~`~!213H@`~~~~~`#33]-P`~`G'55
`
end
```

102. SS ID using "positive AM"

From: wpns@world.std.com (William Smith)
Date: Wed, 30 Apr 1997 09:09:55 -0400 (EDT)
To: ss@tapr.org
Message-ID: <199704301309.AA15183@world.std.com>
Rendered body type: text/plain

Tony McConnell sez:
>if we remain stuck with the current rules, amplitude modulate the whole
>envelope. but wow what a silly idea. but not quite as silly as unique codes.

Why is it silly? A couple of messages back I saw a proposal to increase the output power (by say 3dB) to ID(*), what's wrong with that? Increasing the power ensures that the ID is heard, the additional QRM won't last long, and it has the side effect of encouraging power control hardware hooks.

I use AM CW to ID the output of an FMTV transmitter at 915 MHz, though I just reduce the output power to minimum for a moment, let it revert to normal in a pattern of dits and dahs, leave it at minimum for another moment, then revert to full power again. Works well, narrowband receivers which are hearing a funny QRM hear that QRM doing morse every 5 minutes. Took a couple of hours to build (and a couple of days to code all the fiddly little bits to make it easily programmable and have selectable messages) with a PIC micro.

A SS ID wouldn't even have to be morse, it could be AM keyed ASCII data that could be decoded with a \$10 box.

--
Willie Smith wpns@world.std.com N1JBJ@amsat.org

103. Re: [SS:1309] Re: Microwave lan for 100 KM

From: Steve Sampson <ssampson@claven.tinker.af.mil>
Date: Wed, 30 Apr 1997 08:09:45 -0500
To: ss@tapr.org
Message-ID: <33674499.41C6@eds.tinker.af.mil>
Rendered body type: text/plain

Pinchook Ronen wrote:

[snip]

> I want to Upgrade the Speed to more then 56K
>
> I can also tell you that I can hear the 800 MHz Trunking station at hifa
> from Mobile at Tel-aviv (100KM away) and the trunk use 25Watt
> So I dont Understand Why cant it be done with Fixed station With Beem
> on 2.4Ghz

Does the trunking station use 10 - 20 MHz of bandwidth?

A better comparison would be a television station. These use about 6 MHz of bandwidth. What's the farthest television station you can watch with a beam? Is it full-quieting (no noise)?

Steve

104. Re: [SS:1311] Re: SS ID

From: Steve Sampson <ssampson@claven.tinker.af.mil>
Date: Wed, 30 Apr 1997 08:14:48 -0500
To: ss@tapr.org
Message-ID: <336745C7.167E@eds.tinker.af.mil>
Rendered body type: text/plain

Bernie Doehner wrote:

>
> [...]
> > it could do so by giving each of us a unique set of fills.

[snip]

> The general concept sounds great, however this brings to mind something
> akin to the what [phfc] are doing right now
> in the frequency domain (I know I am exagerating a bit, but someone will
> have to do the paper work for registering the spreading codes).

I saw an interview once with an engineer who was on the ethernet protocol team. His comment was, that he wished they never settled on 48 bits. If they had used a larger word, all that registration and address blocks could have been avoided. Plan on something on the order of 128 or greater.

Steve

105. Re: [SS:1324] SS ID using "positive AM"

From: Tony McConnell <n3jly@erols.com>
Date: Wed, 30 Apr 1997 10:47:50 -0400
To: ss@tapr.org
Message-ID: <199704301447.KAA20971@smtp1.erols.com>
Rendered body type: text/plain

At 08:12 AM 4/30/97 -0500, you wrote:

> Tony McConnell sez:
>> if we remain stuck with the current rules, amplitude modulate the whole
>> envelope. but wow what a silly idea. but not quite as silly as unique codes.
>
> Why is it silly? A couple of messages back I saw a proposal to
> increase the output power (by say 3dB) to ID(*), what's wrong with
> that?

follow the thread back, i agree with the idea of am iding, if a narrow copyable id is to be done at all. i really don't think loads of unique codes are a good idea.

currently i'm planning on using such a manner on a prototype. using the one

output from a 9612 connected to the I port of my qam modulator to cwid on schedule, and the high speed direct digital port Q port for the actual data. this scheme when used in a band where ss is permitted would be legal.

is a three dB change in level enough to be readable? 1dB and 2dB deferences can often be sensed, but can't contain much inte

106. SS ID summary

From: "Alan J. Eynon" <aeynon@micro.ti.com>
Date: Wed, 30 Apr 1997 10:55:58 -0500
To: ss@tapr.org
Message-ID: <3.0.32.19970430105558.0068bf30@pcmail.micro.ti.com>
Rendered body type: text/plain

Just for my own peace of mind, I compiled the following list of identification methods discussed so far:

Superimpose on the spread signal

Method: CW keyed carrier or other narrowband superimposed ID signal
timed to go off at some regular interval

Advantages:

- * Easy to create
- * Familiar to narrowband users / requires no special equipment to ID

Disadvantages:

- * Potential to interfere with weak signal users
- * Past experience (everyone IDs at the same time) is that this is more of an annoying joke

Modulate the external characteristics of the spread signal

Methods: AM the power of the spread signal to send either ID as either morse or ascii

Advantages:

- * About as easy to create
- * Consonant with power control
- * Comprehensible to narrowband users / requires no special equipment to ID

Disadvantages:

- * Still has potential to interfere with weak signal users (anything that could break the threshold of their theoretical most sensitive receiver)
- * Still requires additional transmitter complexity

Internal to the spread signal

Methods:
* originator ID# within data packets
* unique spreading sequence per amateur

Advantages:

- * Consistent with precedent (ID in the mode you're transmitting)
- * Requires no additional spread spectrum transmitter complexity
- * Causes no narrowband interference

Disadvantages:

- * Not accessible to the narrowband users
- * Requires despreading the signal (which requires knowing the spreading sequence)
- * Method one requires a complete spread spectrum receiver outfit in order to find the originator ID# in the packet header

Also, I'm unclear on what the identifier includes. Is it just the station call sign? Call sign and spreading sequence taps? Does it include transmitter power? Location? Please excuse me if this has been discussed already.

Software Development Systems, Stafford, Texas Instruments, +1 281-274-2943

"I told you, I'm not allowed to argue unless you've paid!" -- Monty Python

107. Re: [SS:1319] Re: SS ID

From: "Alan J. Eynon" <aeynon@micro.ti.com>
Date: Wed, 30 Apr 1997 11:23:57 -0500
To: ss@tapr.org
Message-ID: <3.0.32.19970430112357.006a15f0@pcmail.micro.ti.com>
Rendered body type: text/plain

>Remember guys, if everyone has a different spreading code you need that
>unique code to hear them, fine for dedicated or point to point stuff, but
>otherwise.... eh.
>
>and the idea that it is easy to see something on the air and that it is
>easy and quick to brute force through to the pn... i don't think so.
>while any of us know that ss does not totally protect a signal from
>interception,
>without real equipment(read big bucks) it is not easy and quick(ask
>Phil, looking at where he works, he has a good idea how likely we
>would be at decerning p/n codes off the air).

Point taken about operating in spread spectrum. If you don't have a quick way to know what spreading sequence the transmitter is using, you're out of luck. If, however, we can leverage off the commercial CDMA hardware that's already available (and getting cheaper daily), brute force searching is not as bad as you think. IS-95 (and Phil can correct me as I'm writing without my notes in front of me) uses 1024 chip sequences, and the search silicon brute forces each one in milliseconds. Even assuming that you have to check the entire 1025 member family of that Gold code I proposed, it should be do-able in seconds.

I suppose it's a matter of outlook. If you want to reinvent all of the wheels you use, including the spreading sequence acquisition, then (yes!) it's a huge job to contemplate. If you view acquisition as a component you can buy off the shelf, like any other ASIC or discrete device, then the problem is mostly a question of deciding what sorts of sequences we want to use and how best to use the available components.

>while it's seems likely we need more codes to use, an assigned codes would
>be an inpediment. it would be good for us to be free to use unique codes,
>i wouldn't want to be forced to.

We currently have a choice between a small number of allowed (regulation) spreading sequences. If this is an impediment, then the opposite approach would be to have a large number of sequences. The largest number of sequences is when we each have our own. But you don't want to be forced to this. I don't understand; is there a "right number" for which you're aiming?

Let me lay out one other thing. We all either have worked split frequency or have a general understanding of how it's done. In my view, two spread operators who're working together would do the same thing with their sequences. I transmit using one sequence, you use another. My receiver is "tuned" to your sequence, and yours is "tuned" to mine. It's completely analogous. In fact, since spread signals can overlay one another without causing interference, ideally we'd be using the same chunk of bandwidth and only "tuning" by spreading sequence.

If we decide that identification is best accomplished by using an external signal parameter (I favor AM modulation of the spread power), then I think we should include the spreading sequence taps as part of the ID transmission. That way, operators who want to build their own acquisition systems will not have to rely on no brute-force searching the entire spreading sequence family.

73
Alan

Software Development Systems, Stafford, Texas Instruments, +1 281-274-2943

"I told you, I'm not allowed to argue unless you've paid!" -- Monty Python

108. Re: [SS:1325] Re: Microwave lan for 100 KM

From: mark@tetherless.net (Mark Oppenheim)
Date: Wed, 30 Apr 1997 12:03:33 -0500 (CDT)
To: ss@tapr.org

Message-ID: <199704301703.MAA02555@tapr.org>

Rendered body type: text/plain

At 08:12 AM 4/30/97 -0500, Steve Sampson wrote:

>Pinchhook Ronen wrote:

>

>[snip]

>

>> I want to Upgrade the Speed to more then 56K

>>

>> I can also tell you that I can hear the 800 MHz Trunking station at hifa

>> from Mobile at Tel-aviv (100KM away) and the trunk use 25Watt

>> So I dont Understand Why cant it be done with Fixed station With Beem

>> on 2.4Ghz

I work with Spread Spectrum stuff all the time in my "real job" on both the 900, 2400 and 5700 MHz bands. Note that comparing narrowband FM to Hopping or Direct Sequence modulation is like comparing apples and oranges.

Despite what many will think (there is a lot of dis-information about resistance to all types of interference that SS supposedly provides) there's a lot of difference between successfully receiving voice transmissions (where your brain is the "modem") and digital (even narrowband ones) over the same media. Multipath, fading, etc can all have detrimental effects depending on what radio and mode you use.

The one big problem (outside of the regulatory issues of running excessive power on non-amateur applications) is that as the bandwidth gets wider, the receiver sensitivity drops. This is true even in 56 kb DSY packet radio systems. As I usually point out to trainees, "just do the math" to estimate range. To do this, one has to take into account:

Transmitter Power

Antenna Cable & filter (if any) losses

Antenna Gain

Receiver Sensitivity (at 10⁻⁶ BER)

Distance (path loss as a function of operating frequency)

For instance at 100 KM at 2.4 GHz, you have a path loss of a whopping 140 dB. Not only do you have to overcome this, but you should also make sure that you have some "fade margin" (signal over and above what you need to overcome your losses) - which is usually at least 15 dB.

Most radios that operate from 500 kbps - 2 MBPS have sensitivities of -75 to -85 dBm (based on the BER number above), and the longer the link, there is more chance of interference, and problems with inversion layers, fresnel zones, etc.

While the 100 KM link "might" be possible, there's still that sticky regulatory problem (most countries limit ERP to no more than 4 watts), and to get the radio sensitivity where it would need to be, you may have to do some bit rate/distance tradeoffs, and use a lower speed radio.

Cheers-

Mark

Mark Oppenheim

Internet: MARK@TETHERLESS.COM

Tetherless Access Limited

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930 East Arques Ave.

Fax: (408) 523-8001 Fax

Sunnyvale, California,

94086-4552 USA

Tech Support: SUPPORT@TETHERLESS.COM

Visit our WWW site! <http://www.tal.net/>

109. Re: [SS:1323] RE: 1315] Re: SS ID

From: Dirk Koopman <djk@tobit.co.uk>

Date: Wed, 30 Apr 1997 22:42:07 +0100 (BST)

To: ss@tapr.org

Message-ID: <Pine.LNX.3.95.970430221954.13431X-100000@dirku.tobit.co.uk>

Rendered body type: text/plain

On Wed, 30 Apr 1997, Gwyn Reedy wrote:

> Lyle Johnson[SMTP:lylej@azstarnet.com]said:

> That is sort of what goes on in the UK, I'm told. They remain under a

> requirement to use CWID, so everyone sets it to go off at 30 minutes after
> the hour. Given the limited accuracy of TNC clocks, they lose about a 2-3
> minute slot each hour, but then are done with it. Does no one any good, but
> fills the regulatory square.
>
>

This gives me a small opening I think. As it stands at the moment we are required to CW ID every 30 minutes. The reason for this that the RIS (the enforcement branch of our equiv of the FCC) can't understand packet. What is curious about this stance is that in the new ETSI 300-113 European data standard (for 1200 bps !) there is a requirement to ID, but in the mode and protocol specified (ie no CW). Interestingly, although the format of the ID packet is specified, nobody quite seems to know how to fill in the fields - and that includes the RA (our FCC).

To move SS forward here in UK requires someone (probably me, since no-one else seems to be much interested) to make a case for it. Now, unfortunately, it seems that the case I have made is almost like a commercial one, ie how will it benefit the human condx, will it interfere, how do we detect it, etc.

Sight seems to have been lost of the original goal of experimentation. In order to get SS legalised here, it appears I have to solve all the problems that have discussed here over the last few days BEFORE any experimentation can take place.

My specific problems right now are:-

- 1) how can I ENSURE (to be defined by our RA somewhen, and not vouchsafed to the likes of me until I/we get it wrong) that ANY amateur can 'join in' an SS QSO.
- 2) how can the RIS detect a transmission and identify where and who it is coming from?
- 3) how can an amateur determine that he is 'in band'.
- 4) why is SS not encryption. Specifically how can the RIS check that I not using the mode for unspeakable things?

I suspect that the FCC probably have similar concerns. One of the things that regulatory authorities seem to get hung up is that if we use efficient SS, the chances are we won't appear on their \$50,000 spectrum analysers/receivers 'cos we are still a number of 10s of db below their noise floor. This seems to give them the willies as we could be transmitting ANYTHING (such as rude comments about their motives :-).

I have heard it said that it is relatively simple to determine a PN sequence. Perhaps someone knowledgable could fill me/us in as to how this is achieved (in broad terms) and how much computing power is required (a future are of experimentation?).

Another related idea is to have a mathematically related series of PN sequences that one could use so you could 'tune' the sequences in a way analogous to a tuning knob on a conventional transceiver. My maths is not strong enough to know how feasible (or desirable) this is.

Dirk

--
Dirk-Jan Koopman Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than the piano when played by a sister or near relation." --Oscar Wilde

110. Re: SS ID

From: Lyle Johnson <lylej@azstarnet.com>
Date: Wed, 30 Apr 1997 19:17:29 -0700
To: ss@tapr.org
Message-ID: <3.0.32.19970430191630.006fc270@pop.azstarnet.com>
Rendered body type: text/plain

This has become a busy thread!

I think it is important to realize that, by *allowing* ID to be done with SS, no one is *precluding* use of narrowband ID techniques. If we are able to operate unfettered in this regard, we can devbise, deploy and refine the best methods; presumably these would be better than if we were *forced* to

use some specific method mandated administratively rather than technically or operationally.

We don't have to design and propose all this by the reply closing date if we are successful in getting the ID issue left out of the rulemaking.

Conversely, if we are shackled by a narrowband ID requirement, we need to compress the next ten year's experience into the next couple of days so we can get the "right" method in the rules...

Cheers,

Lyle

May 1997

Original source file: ss.9705

Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9705

1. SS ID

From: "Alan J. Eynon" <aeynon@micro.ti.com>
Date: Thu, 01 May 1997 09:55:50 -0500
To: ss@tapr.org
Cc: aeynon@micro.ti.com
Message-ID: <3.0.32.19970501095550.0069cacc@pcmail.micro.ti.com>
Rendered body type: text/plain

Hi Dirk,

>Sight seems to have been lost of the original goal of experimentation. In
>order to get SS legalised here, it appears I have to solve all the
>problems that have discussed here over the last few days BEFORE any
>experimentation can take place.

There was only one catch, but that was Catch-22...

>1) how can I ENSURE (to be defined by our RA somewhen, and not vouchsafed
>to the likes of me until I/we get it wrong) that ANY amateur can 'join
>in' an SS QSO.

With all due respect to the appropriate authorities, but are they aware
that holding a valid license does not ensure that any amateur can join in
any QSO in any current valid operating mode? You still have to have the
right equipment, propagation conditions, operational elan, etc.. Do we
outlaw 30 wpm CW QSOs because some licensed amateurs can only operate at
13?

<snip>

>4) why is SS not encryption. Specifically how can the RIS check that I not
>using the mode for unspeakable things?

It's not encryption because we're not hiding the data in any way. Perhaps
the best way to present this is to say that, instead of transmitting one
bit as one bit, spread spectrum transmits one bit as multiple bits (which
we call chips, to avoid confusion). That is to say, if we are spreading
each bit with (for instance) a 511 chip sequence:

```
data bit:  1
x
chips:      1 -1  1  1 -1  1 -1 -1...
-----
spread signal: 1 -1  1  1 -1  1 -1 -1...
```

whereas for sending zeroes:

```
data bit: -1
x
chips:      1 -1  1  1 -1  1 -1 -1...
-----
spread signal: -1  1 -1 -1  1 -1  1  1...
```

all we've done is flip the sequence. It's not as though each bit were
getting multiplied by a non-repeating, random, and secret code.

>I have heard it said that it is relatively simple to determine a PN
>sequence. Perhaps someone knowledgeable could fill me/us in as to how this
>is achieved (in broad terms) and how much computing power is required (a
>future are of experimentation?).

Let me break this down into scenarios:

A. A legitimate amateur transmission. Chances are good that
either the authorities will have the amateur's spreading sequence on
record, or it will be one of a small number of valid sequences. They
could also monitor the amateur's ID signal and find out what sequence
is being used. There shouldn't be any problems in this case.

B. Other, illegitimate transmissions. Presumably these
transmissions have enough power that they are getting noticed. If
someone transmits a genuinely clandestine signal (for whatever nefarious
reasons) below the noise, I would argue that by definition it's beyond
any sort of regulation the authorities impose on legitimate users. In

other words, it make no sense to impose regulations on us (the legitimate users) in an attempt to control the actions of those who desire to operate outside of the law. These sorts of worries are best left to the intelligence agencies.

Given that the signal has made itself noticed, the most straightforward way to determine the PN sequence is to demodulate it directly. From the spectral presentation of the signal, you can determine the chipping rate and the rate at which the spreading sequence repeats. That tells you how long the spreading sequence is. If the spread C/N ratio is good enough, you can demodulate the chips themselves, and recover the sequence.

Of course, if the sequence is very long, the chance that you'll correctly demodulate all of the chips decays exponentially to zero. And the situation only gets worse at lower C/N ratios.

If the sequence is truly a pseudo-noise sequence generated by shift registers, well, there's only so many sequences of a given length. One can test each candidate by a method called sequence estimation. Let's say you know that the spreading sequence has 1023 chips in it. You know that there are (say) 100 different tap point arrangements that generate sequences of this length. You set up your taps for the first generator, demodulate just 10 chips to fill your shift register, and start things going. If it despreads, you did everything correctly. If it doesn't, you either made an error demodulating one (or more) of the chips, or you have the wrong set of tap points. Note that this cuts down on the number of chips you need to demodulate, so the likelihood that you'll make (in this case) 10 decisions correctly is exponentially better than if you had to demodulate all 1023 chips.

>Another related idea is to have a mathematically related series of PN
>sequences that one could use so you could 'tune' the sequences in a way
>analogous to a tuning knob on a conventional transceiver. My maths is not
>strong enough to know how feasible (or desirable) this is.

Depending on the implementation, this is eminently feasible. For instance, in one of my previous e-mails I mentioned using a Gold code. Gold codes are created by XORing together the outputs of two linear recursive shift registers. The tap points on the two registers have to be specially chosen "preferred pairs", but these have already been discovered and tabulated.

Let me give an example. Let's say that (over here) the FCC decided to allow us to use a family of 1023 chip Gold code spreading sequences. It would then standardize on a single set of preferred pair tap points. Taken by themselves, the register with tap point set A generates one 1023 chip sequence, and the other register with the other tap points generates another 1023 chip sequence. So that gives us two possible spreading sequences. If you then allow us to create Gold code sequences by XORing the two sequences together, this gives an additional 1023 possible sequences (differing only in the relative offset of the two original sequences). By adjusting the relative offset of those two shift register generated sequences, an amateur could "tune" through all of the possible Gold code spreading sequences, until the correct sequence is found and the received spread signal despreads.

(I know, it's not as easy in practice as the preceding paragraph makes it sound, but at this point we're discussing the concept so everyone understands what is possible.)

The length of this e-mail is getting rather forbidding, so I'm going to stop here. I'd be happy to discuss the matter further, though, particularly if there are more questions.

73
Alan

Software Development Systems, Stafford, Texas Instruments, +1 281-274-2943

"DESTROY 99% OF KNOWN HOUSEHOLD PESTS WITH PRE-SLICED, RUSTPROOF, EASY
TO HANDLE, LOW CALORIE SIMPSON'S INDIVIDUAL EMPEROR STRINGETTES, FREE
FROM ARTIFICIAL COLORING (AS USED IN HOSPITALS)." -- Monty Python

2. A word on comments for the SS NPRM

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Fri, 2 May 1997 08:42:32 -0700
To: ss@tapr.org, ss-sta@tapr.org

Message-ID: <v03102800af8fb678560b@[204.118.182.22]>

Rendered body type: text/plain

Comments are due at the FCC for the SS NPRM on Monday. I thought that I would post some information on how to do this and a few other things that come to mind:

o Comments are due on or before May 5, 1997, and reply comments are due on or before June 5, 1997. To file formally in this proceeding, you must file an original and four copies of all comments and reply comments. If you want each Commissioner to receive a personal copy of your comments, you must file an original plus nine copies. You should send comments and reply comments to the Office of the Secretary, Federal Communications Commission, Washington, DC 20554. Refer to WT Docket No. 97-12 at the start of your comments or reply comments.

o If you miss the Monday deadline, and you feel that you have something to say on this rulemaking, then file your comments as soon as you can. The FCC is usually quite liberal in accepting late filed comments in amateur radio rulemakings.

o TAPR will be filing its comments on this rulemaking on Monday. After Monday, they will be available for examination at the TAPR website <<http://www.tapr.org/ss/>>.

o It is our intention to have all of the comments and reply comments that are filed available for examination on the TAPR website. They will be available as soon as we can get them up there, so please be patient.

Finally I'd like to make an editorial comment. In the petition for rulemaking phase of this proceeding (RM-8737), only 15 comments and 17 reply comments were filed. All in all, I'd say a pretty poor expression of interest in this matter by the amateur radio community!!!

So, its 'crunch' time people!!!! Time for you to stand up and be counted in Washington on this issue. When this rulemaking is concluded and you find that you don't care for the final spread spectrum rules that come out of it, you'll only have yourselves to blame!!

-- Dewayne

Chair
TAPR Regulatory Affairs Committee

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
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Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>  
Fax: (510) 770-9854 !  
~~~~~

3. Re: [SS:1334] A word on comments for the SS NPRM

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Fri, 2 May 1997 14:11:47 -0500
To: ss@tapr.org, "TAPR Spread Sprctrum" <ss-sta@tapr.org>
Message-ID: <v03020912af8fe6f3dc24@[208.134.134.40]>
Rendered body type: text/plain

Very good comments Dewayne.

Just to added, there is a format for filing. If you have filed before, then you have a format you like, but for those that want to jump in I'll include an example outline below.

Note: I don't provide any words for you to use -- I don't believe in sending out example filings for people to copy and mail in. While the effort is sometime well placed, people seem to just copy it without actually putting it in their own words -- which the FCC sees and sometime just count as one filing instead of many. You have to take the time and learn just a little and write about the issues important to you. That might be power control or power level, the rules that are still in place about detailed logging (don't forget they are still in place and not discussed in the docket), IDing issues, Freq of operations, or many of the others that have been discussed on this list and in the comments of the original rule making.

Like Dewayne points out, if you are interested in this mode and the potential for experimenting and developing new systems, are you going to allow 30-50 people -- who are not all in favor of change -- determine what

the FCC decides what you can do in our service.

If you are looking for a format or how other have done it, there are only about 30+ examples on the TAPR SS web page (http://www.tapr.org/ss/rule_changes.html) regarding the comments and reply comments filed to date. If you are going to file, be sure to look over some of these and get a feel for how people have approached the filing.

It is almost as important to file in the correct format as to make your point. This sounds silly -- but think about it. You don't have to write lots of page for a good filing either. Some of the best ones are just a few pages long. What I have below is simple enough. Tell the FCC who you are and a little about yourself and why you are filing. Tell them what you want changed or deleted or added. Then explain why this is the case for each change, delete, or add. Then tell them again what you want changed or deleted or added. Then say sign your name.

Cheers - Greg

Before the
Federal Communications Commission
Washington, D. C. 20554

In the Matter of	)	WT Docket No. 97-12
	)	
Amendment of the Amateur Service	)	RM-8737
Rules to Provide For	)	
Greater Use of Spread	)	
Spectrum Communication	)	
Technologies	)	

To: The Commission

COMMENTS OF John Q Amateur, Callsign

Your Address
City, State Zip
telephone or e-mail address (optional)

February 26, 1996 (the current date :-)

Introduction

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

A typically intro explains to the FCC who you are and why you are writing in a few paragraphs.

Overview

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

In a few paragraphs say what you are going to outline and reinforce in the discussion section.

Discussion

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

This is where you get to really make your case for whatever you are wanting to tell the FCC. Break your points into sections and explain each in detail and give reasons and examples for each.

Conclusion

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

State what you are asking for again and conclude. Again, a short section.

Say bye and sign, Your Name

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd

4. my 97-12 Comments

From: "Robert A. Buaas" <buaas@wireless.net>
Date: Fri, 2 May 1997 15:42:20 -0700 (PDT)
To: ss@tapr.org
Cc: buaas@wireless.net
Message-ID: <199705022242.PAA26543@wireless.net>
Rendered body type: text/plain

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	WT Docket No.97-12
	)	
Amendment of Amateur Service	)	RM-8737
Rules to Provide For	)	
Greater Use of Spread	)	
Spectrum Communication	)	
Technologies	)	

To: The Commission

COMMENTS OF ROBERT A. BUAAS, K6KGS

Background -----

I have been licensed in the Amateur Radio Service since 1953. I earned my Amateur Extra Class license in 1961, when I was age 17. For most of my lifetime, I have enjoyed the privilege of experimenting with radio communications, a pasttime I truly love. In addition, I hold a Special Temporary Authorization (STA) dated December 27, 1994, that permits experimentation with any Spread Spectrum (SS) technology in all Amateur spectrum above 50 Megahertz. My involvement with Amateur SS dates back to its original contemplation by AMRAD, in whose STA I participated. I have contributed to the development of successful commercial Part-15 SS systems, and I am a charter member in IEEE P802.11 (the Wireless LAN Ethernet Standard development project).

Introduction -----

I view the adoption of the Rules Change contained in the proceeding with considerable dismay. While its claimed goal is to simplify and encourage SS, it in fact would contribute to the reduction or elimination of its use.

Precious few of the commenters in this proceeding have any personal practical experience with SS. I find it curious that the spokespeople for the weak-signal interests, particularly Tynan of AMSAT, continue to present their conjectures of doom as fact, without bothering to conduct any realistic tests to validate their claims. Recently, I was invited to speak at the NASA Jet Propulsion Laboratory to Amateurs interested in the current state of affairs in Amateur SS. That opportunity was particularly rewarding, in that some of those same members are responsible for the SS technology used in NASA's deep space weak-signal communications. The concerns of the FM/repeater community are also unfounded, and I address their situation in the Discussion below.

That Commercial interests, particularly Part-15 promoters, seek parity with Amateur operators in the context of this proceeding seems to me to be entirely inappropriate. Metrocom and Symbol Technologies wish to advance their business interests at the expense of Amateur Radio operators opportunity and earned privilege at advancing the State of the Art in Radio Communication. Such is one of the Purposes of the Amateur Radio Service. Part-15 proponents knew and continue to know the Rules and relative priorities of the two Services when they chose to

enter the business. Such are the risks of business, and they deserve to abide by their decisions.

Summary

I urge that Commission turn aside this proposal in favor on one which implements the spirit of the environment provided for participants of the STA(s), to wit, (a) operation in any Amateur bands at 50 MHz and above without restriction, (b) use of any coding and/or modulation technology imaginable, (c) permit DIn-modeD identification, and (d) eliminate restrictions, thus providing encouragement for designs that reduce interference. I made the same recommendation in my filings on RM-8737. To date, noone has come forward with any evidence that Amateur SS emissions have interfered with anyone.

While I admire the elegance of Phil KarnDs proposal for Automatic Power Control (I enjoyed the several discussions we had during its gestation), and I encourage its use, I cannot agree that the specifics of this proposal belong in the Rules. We already have a provision that says: "Use Minimum Power." Rules should apply to ALL systems, not just new ones. There are so many violations of this Rule now, I find it entirely inappropriate that only SS should be saddled with a proposal this specific. After all, it is the very nature of the specificity of the current Part 97 Rules for SS that have all but prevented its use.

Spectral Partitioning, of the variety practiced currently, also is without merit. What will happen when the day comes that a novel weak-signal application wishes to use the very SS technology now proven for deep space, yet the Rules prevent it use in spectrum reserved for weak-signals? Such Rules have proven to be short sighted. The results of this proceeding will affect Amateur Radio for at least a decade. Few of us have sufficient vision to see that distance into the future. Let history be our guide.

Discussion

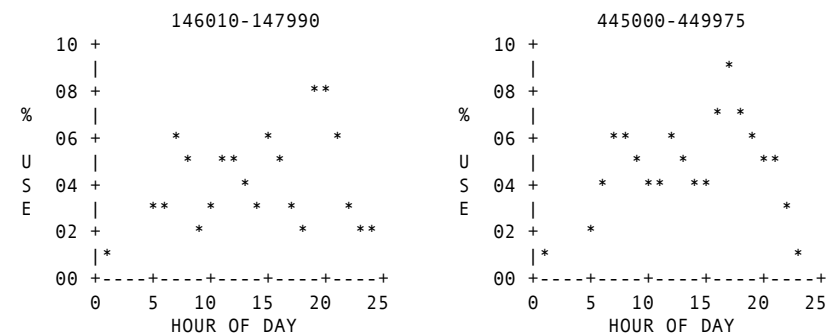
In this section, I wish to turn some illumination on the subject of conjectured INTERFERENCE to existing operations. This a popular topic, to say the least. I have been the subject of some criticism from those who dispute my claims that properly designed SS system have minimum liklihood of causing interference. Most vocal has been the Repeater Coordination community, yet they have to conduct any independent studies or come forward with documented cases of interference. They certainly have the means and expertise to do their own tests, yet they refuse, and complain all the while.

Having once been a Frequency Coordinator, I understand their position, and their frustrations. They have only one degree of freedom, the Frequency Domain, in which to operate. Perhaps they have two, if one considers the Spatial Domain (stations that would otherwise interfere unacceptably, were it not for the distance or terrain that separates them). The degree of freedom they donDt command is the Time Domain. Dealing in the Time Domain requires systems complexity that is currently beyond current Amateur practice. The consequence that Amateur repeaters cannot handle frequency agility has lead to the operational mentality that a Coordinated Repeater DownsD the frequency on which it operates, whether it is IN USE or NOT. Alternative use of its input frequency could mean denial-of-service to authorized repeater users, and thus is defined as INTERFERENCE. Notwithstanding, the Rules are very specific, saying that no Amateur station has any title to any particular frequency. Repeater Owners believe the contrary, and they act like it. Repeater Wars have been fought over single frequencies.

What is fundamentally interesting is the NOT part of the notion above. The prevailing attitudes have lead to particularly low levels of spectral utilization in the Amateur VHF and UHF bands. This is obvious to anyone who looks casually but critically at consecutive scans on the face of a spectrum analyzer. On any one scan, there are very few spectral lines representing current usage. The situation is very dynamic, as repeater transmitters activate and deactivate at essentially random times in response to the needs of their respective users. Several years ago, when I began designing STA experiments for assessing the coexistence potential in "densely populated" repeater spectrum, I began collecting real-time utilization data, principally for use in simulations, testing the merits of a variety of frequency and time

hopping patterns. This data validated my operational experiences that the interference to existing system was negligible.

Consider for a moment the age-old question: Is there sound when a tree falls in the forest, if no one is around to hear it? The following charts show that very little of the popular repeater spectrum is actually in use at any one instant. Conversely, much is available to time-agile systems on a minimum/non-interference basis. The vertical axis is percentage of total spectrum in use; the horizontal axis are the hours in a day. Predictably, certain times see more activity than others. What is not obvious is the low level of simultaneous demand. These charts show, even for the allegedly densely-populated Los Angeles area (for the most part, each of the 133 146-MHz and the 200 445-MHz repeater channels have multiple coordinations per channel), in the TIME domain, the spectrum utilization is well below ten percent (10%).



The charts contained in Appendix-A further elaborate on these findings. The first set of 24 charts show the contiguous part of the 2-Meter repeater band hour by hour. The presentation is useful in seeing the probability of collision FHSS systems would experience. The vertical axis shows the frequency of occurrence; the horizontal axis shows the number of possible collisions. The second set of 24 charts show data taken simultaneously with the 2-meter data, but for the 445-MHz band. These data conclusively show why our experimental systems achieved no measurable impact. THERE WASNOT ANY IMPACT TO BE HAD.

Further, this situation is little different elsewhere.

It is easy to see why various Commercial interests have launched efforts to reallocate Amateur spectrum to their Service(s).

There is some good news here: given that Amateurs would embrace this technology, and rise to the technical challenges it poses (which are not minor), there need never again be denial of service for Amateurs needing to communicate. FH is one of the simplest and easiest SS systems in operation today. Most Amateur VHF/UHF transceivers contain all the elements needed to do FHSS. By design, they are not configured properly, and the software needed to acquire and maintain synchronization is missing. Most also require slight modifications to the Frequency Synthesizer.

Of course, if this mode catches on, there will be little need for Frequency Coordinators -their power and prestige will be gone. Simple public databases on the Internet will serve to negotiate and declare code sequences and timebase references.

The examples given here are but few of the many possibilities for coding technology, SS representing a small piece along that continuum. My view is that the Amateur Rules should permit the widest possible interpretation and latitude.

Writing Rules requires VISION; we seem to lack the very thing we most need now.

Conclusion

Spread Spectrum is a complicated art. Even the simplest SS system designs have been, to date, beyond the technical reach of all but the most advanced Amateurs. Yet, it offers considerable promise, not the least of which is much better spectral utilization than is the current practice. Perhaps more importantly, Amateur Radio is one of few vehicles for encouraging young people into taking up a professional

careers in Radio Engineering. Without the freedom to try new ideas, those individuals will turn elsewhere. The Internet is currently a powerful draw. Fewer and fewer radio engineers are entering the field from college. I believe that it is the Commission's responsibility to nurture this Service, not limit it or contribute to its demise. I urge you to see the detractors in their true light, and adopt the proposal I make in the Summary above.

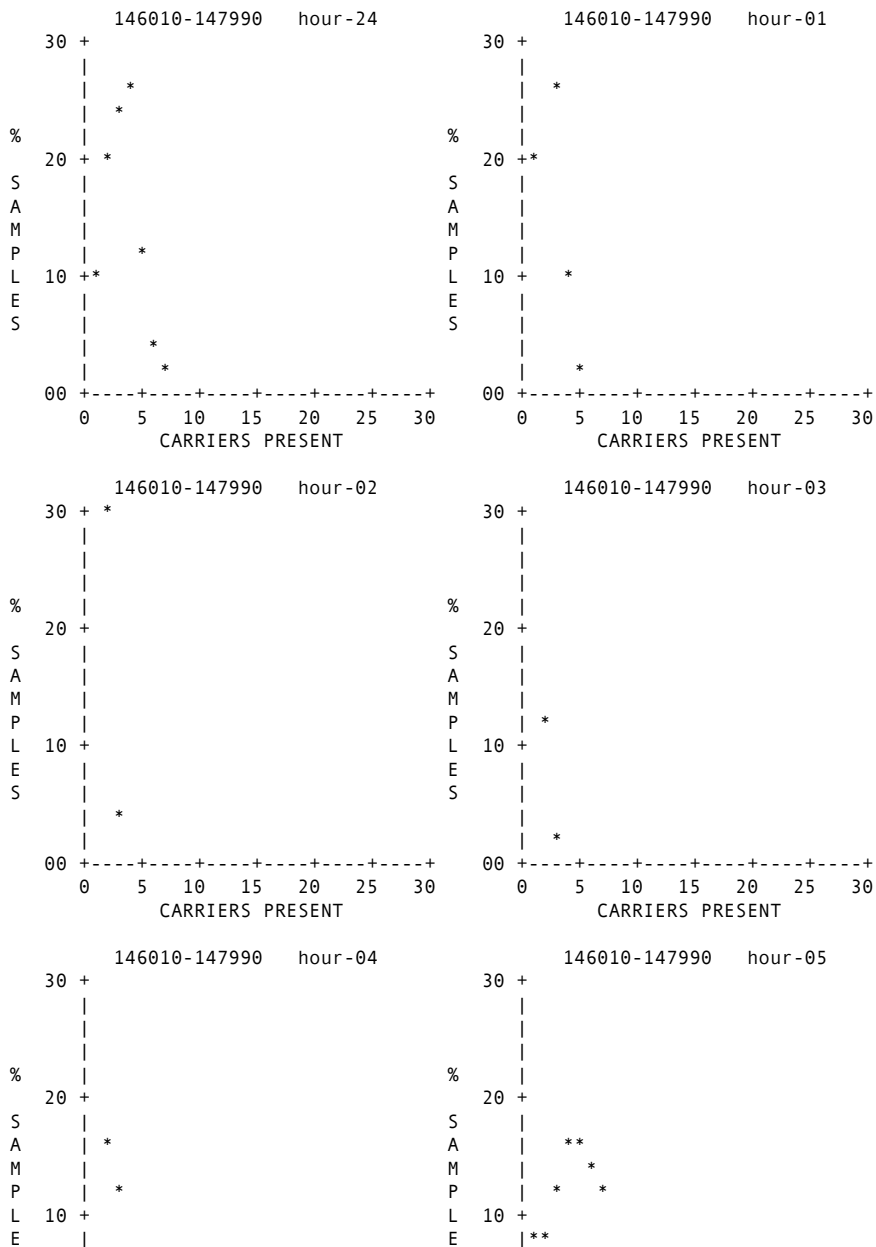
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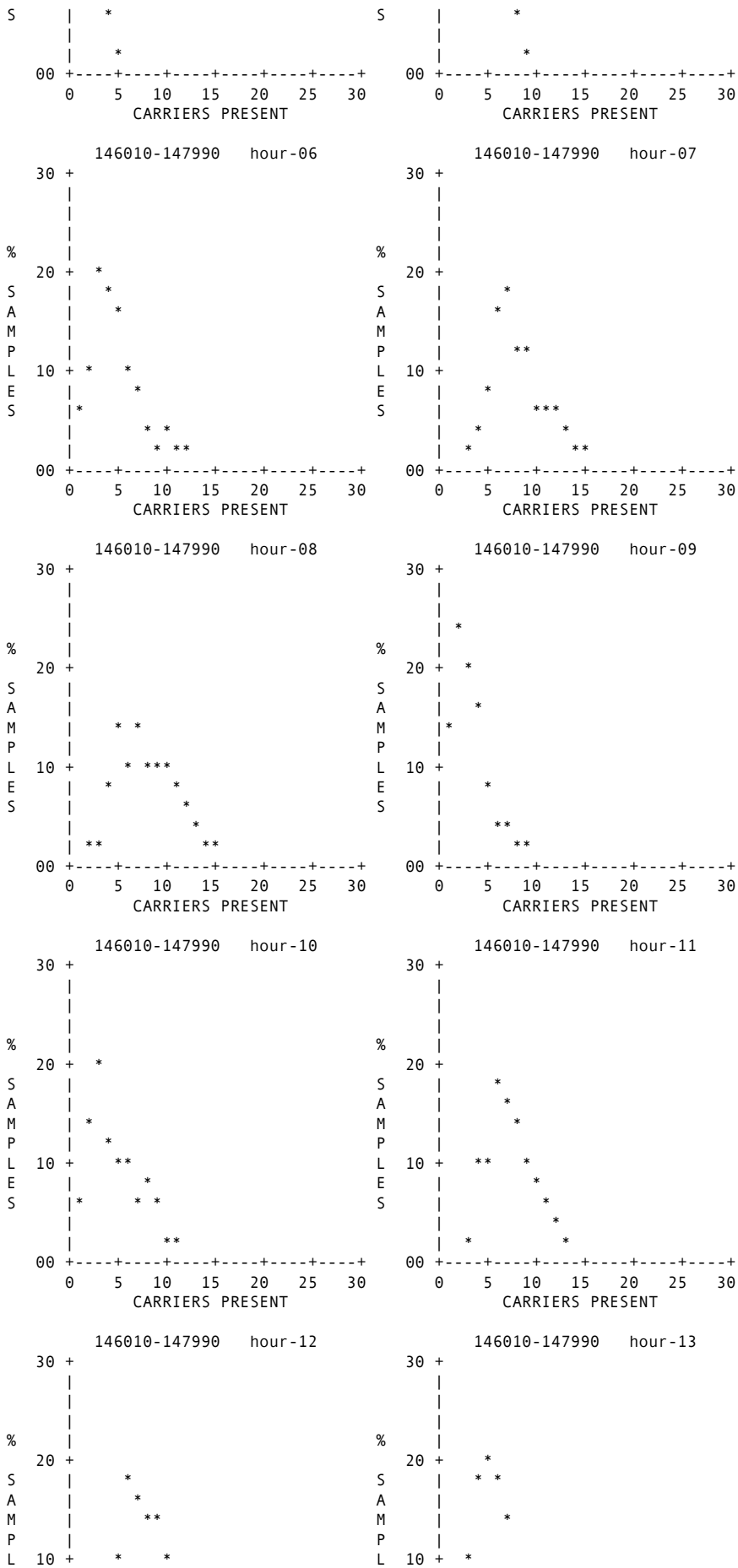
By Robert A. Buaas, K6KGS

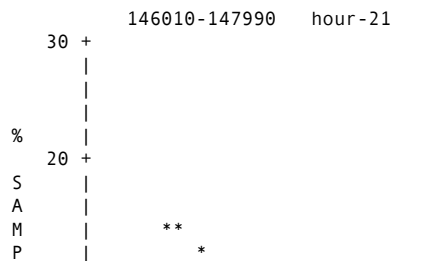
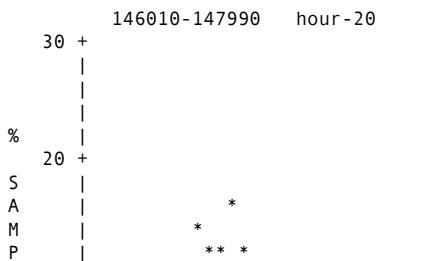
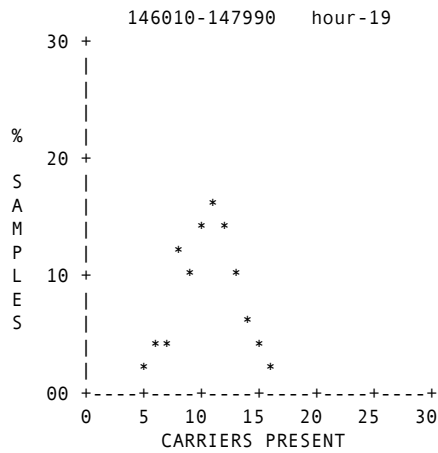
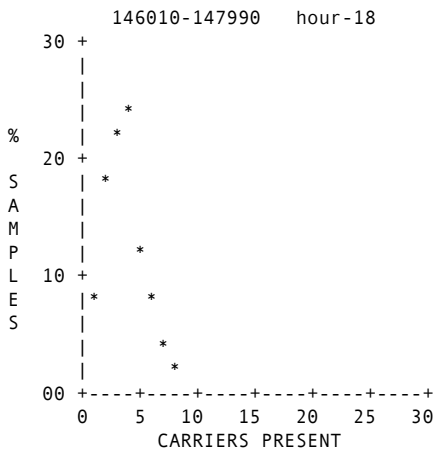
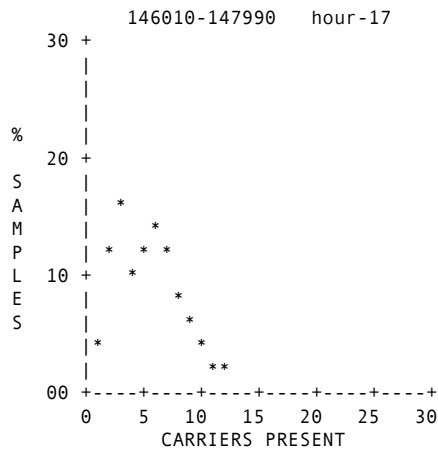
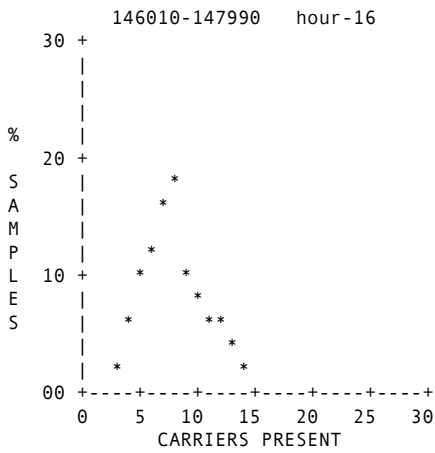
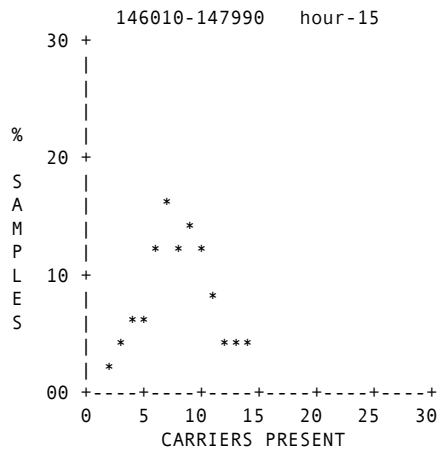
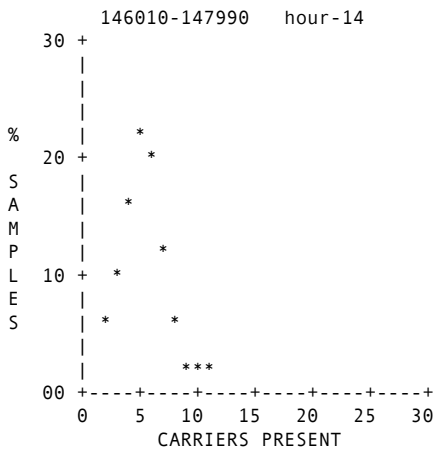
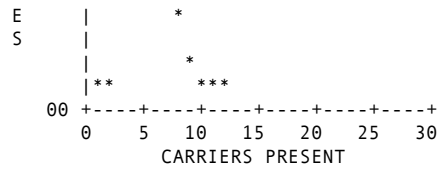
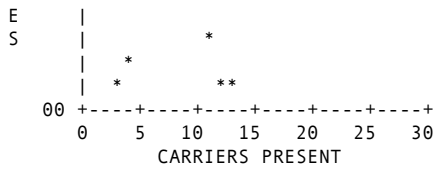
May 2, 1997

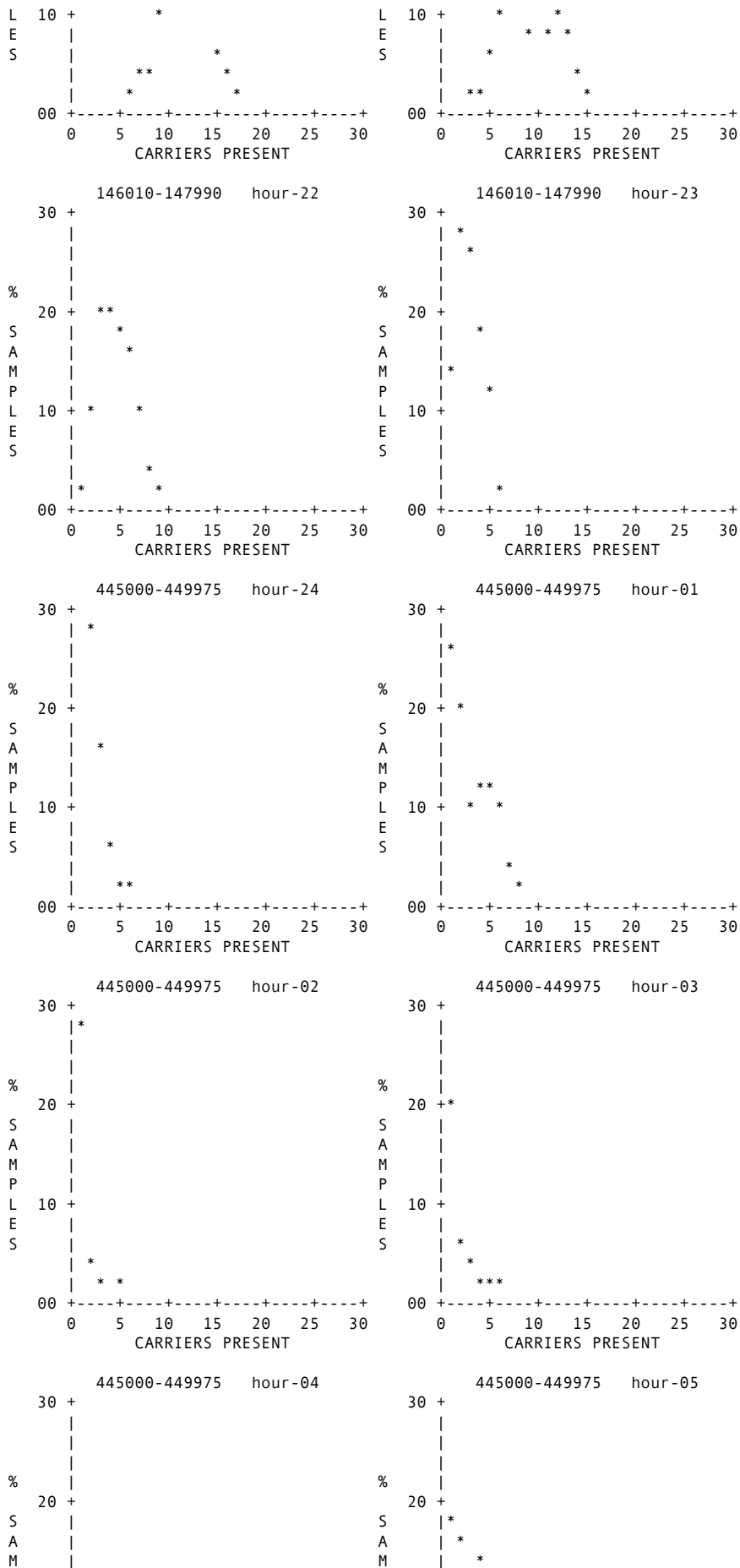
Mailing Address:
10044 Adams Ave. #108
Huntington Beach, CA 92646
E-Mail: buaas@wireless.net

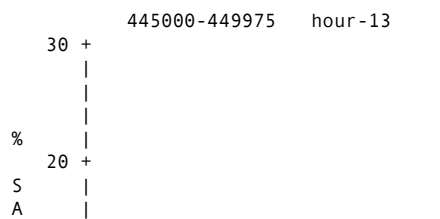
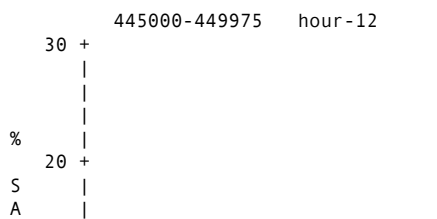
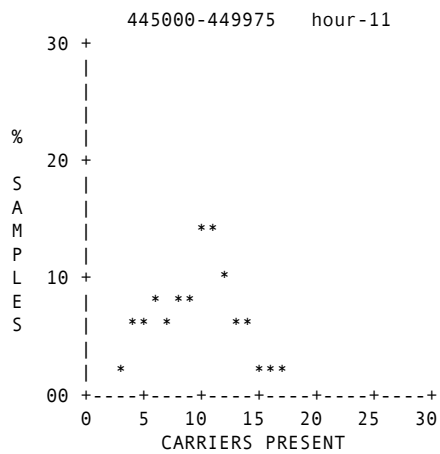
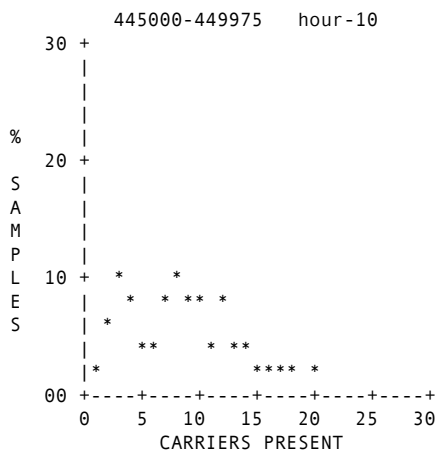
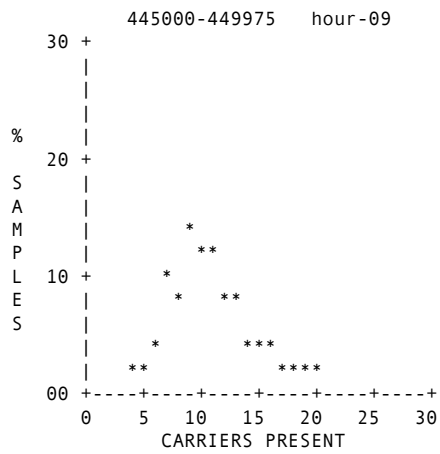
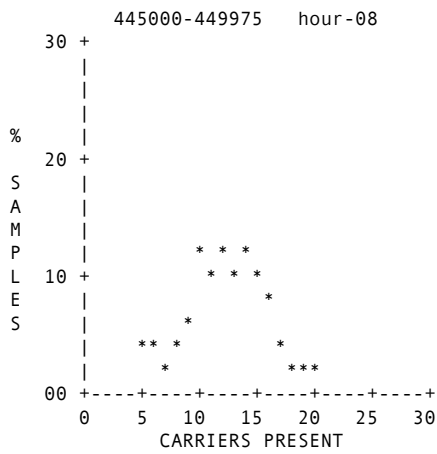
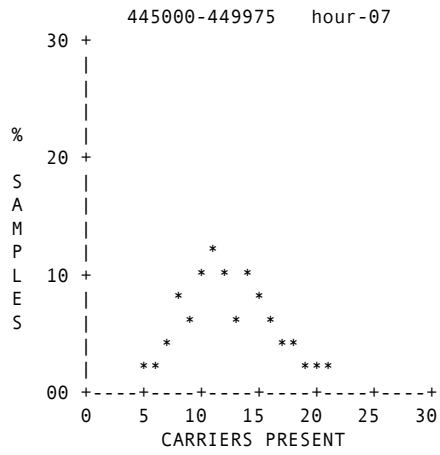
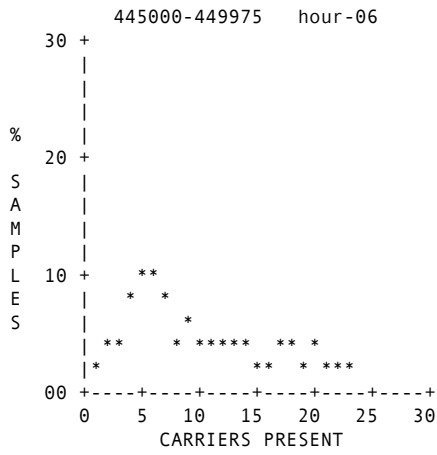
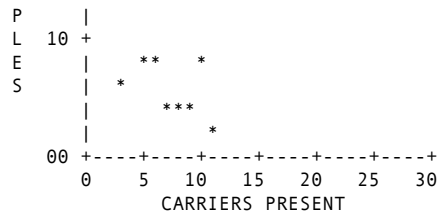
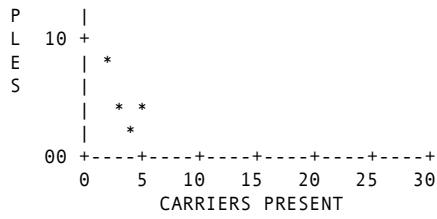
APPENDIX-A

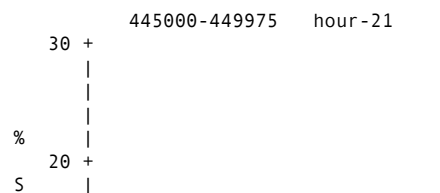
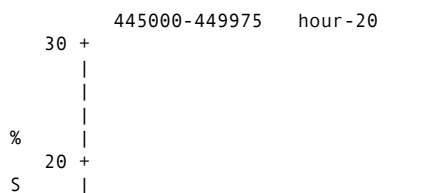
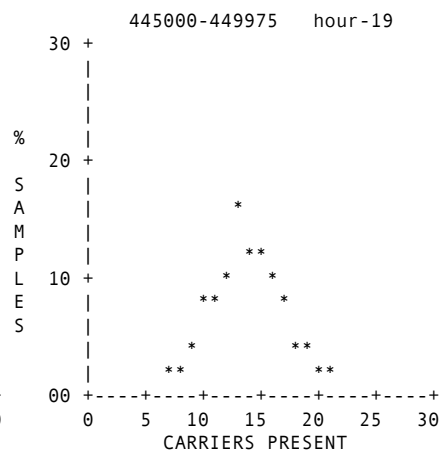
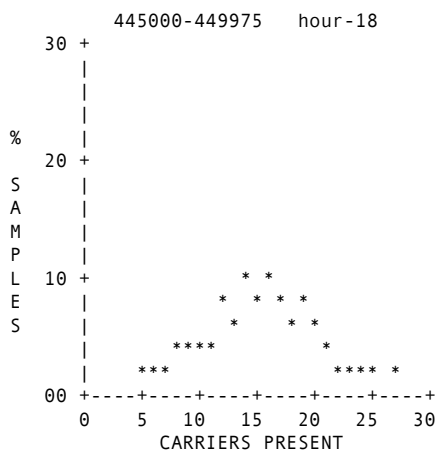
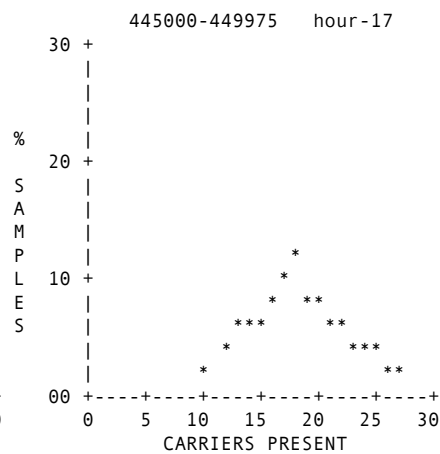
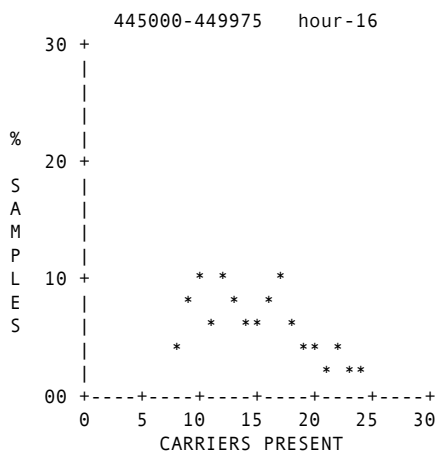
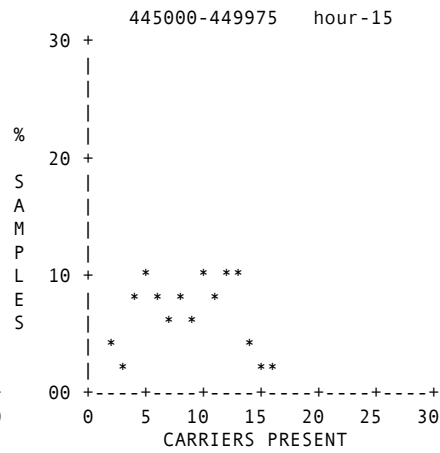
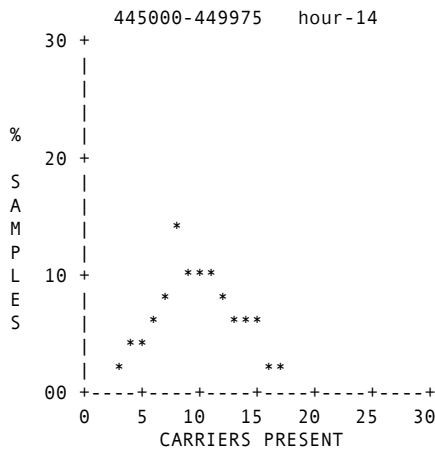
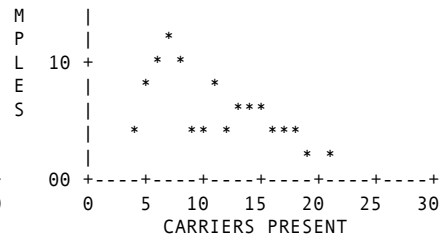
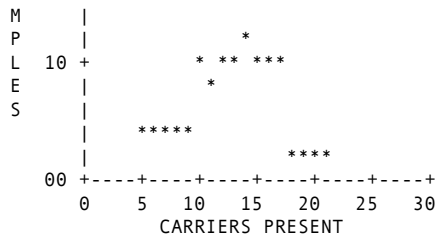


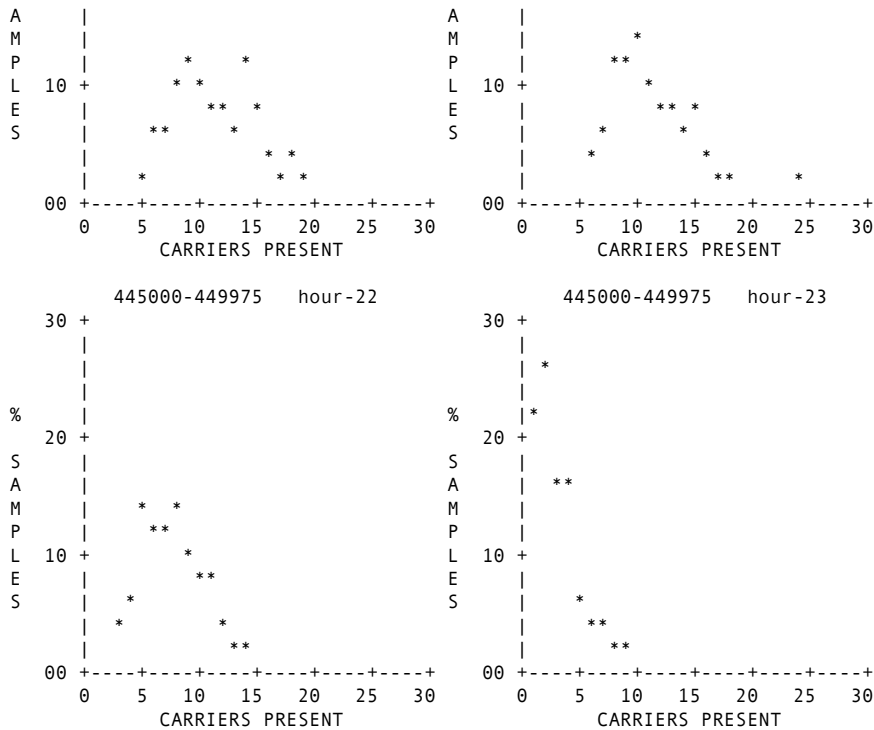












5. Re: [SS:1307] Re: SS ID

From: Phil Karn <karn@qualcomm.com>
 Date: Fri, 2 May 1997 21:21:42 +0000 (UTC)
 To: ss@tapr.org
 Message-ID: <m0WNpME-000RurC@laptop.ka9q.ampr.org>
 Rendered body type: text/plain

>I don't suppose we could settle for something subtle like the
 >spreading sequence itself? For instance, using two 10-stage

The last thing we want are any hard-coded rules specifying the
 spreading sequences we can use. That's what we're trying to get
 away from in this proceeding.

Phil

6. Re: [SS:1310] Re: SS ID

From: Phil Karn <karn@qualcomm.com>
 Date: Fri, 2 May 1997 21:38:22 +0000 (UTC)
 To: ss@tapr.org
 Message-ID: <m0WNQ2M-000Rx1C@laptop.ka9q.ampr.org>
 Rendered body type: text/plain

>yes in-band idong would be iding in the data payload, as with packet now.

Perhaps we could call it "in-mode" IDing, to emphasize that the ID is sent
 with the same modulation mode. "In-band" IDing still implies only that the ID
 is in the same frequency band with the exotic mode.

>in a way a narrow band id makes less sense than a wide one. from the
 >prospective
 >of the narrow band user, he can't be sure that the id he can hear is the wide
 >signal that is making him miserable.

Not unless the narrow band ID is set such that you're not likely to hear it
 unless the associated wide band signal is already interfering with you. This
 is fairly straightforward if you can make assumptions about the RX bandwidths
 of the narrowband stations that you may interfere with.

>how about a continuous morse or mcw of the carrier amplitude while in use? say

Ordinarily there would be no discrete carrier component in a SS signal. Though
 you could deliberately inject one, as in my earlier proposal to unbalance the
 mixer.

>the supposed interference is. but any narrow slow id becomes silly with the
 >sort of transmissions that will likely the the use of these radios.

This is a good point -- I don't know why I didn't think of it earlier. I guess I was thinking of relatively slow links on the lower bands where QRM is more of an issue. Here transmissions would be fairly lengthy, long enough for a CWID.

Phil

7. Re: [SS:1317] Re: SS ID

From: Phil Karn <karn@qualcomm.com>
Date: Fri, 2 May 1997 22:07:21 +0000 (UTC)
To: ss@tapr.org
Message-ID: <m0wNQUP-000Rx4C@laptop.ka9q.ampr.org>
Rendered body type: text/plain

>Just a thought: If the power already has to be controlled, why not
>increase the power to ID in CW, etc... If this is infrequent (every 10

I am strongly opposed to any suggestion of increasing power just to ID. That is a good way to interfere with your ID even when your regular emission doesn't bother anybody. And as a result, you'll become notorious as that "SS interferer" even if the only thing interfering is your CWID!!

Phil

8. SS Questions for Rule Filing

From: Tony Lanier <tony@spacey.net>
Date: Sat, 03 May 1997 07:00:32 -0400 (Eastern Daylight Time)
To: ss@tapr.org
Message-ID: <199705031100.HAA00028@surfergirl.spacey.net>
Rendered body type: text/plain

Hi all,

This ID issue concerning SS has generated alot of responses - at least we're interested in talking about SOMETHING!

I have some questions, though, that I would like to ask: if a packet station is causing interference, how is that station supposed to be identified? Can a weak signal guy or a DX'er identify the interfering packet station? I realize that packet sends an ID inside a packet header (so I was told), but do you need a special device to decode it?

If this is so, then I see no reason why SS should be treated any different than other modes. We should all follow the minimum power requirement for communication AT ALL TIMES, no matter what modulation method we choose. It makes no sense to use 50W to transmit only 5 miles. And if packet ID's itself within the packet itself, why can't SS ID itself within a SS transmission?

I'd also like to know if someone knows of a study comparing the output spectrum of a narrowband transmitter to a SS transmitter, both operating at , say 50 watts? In other words, would a SS system transmitting at 100 watts overpower a narrowband system transmitting at 10 watts, under ideal conditions? Is there a linear relationship to this?

I would like to know the answer to these questions before I submit a filing with the FCC. At least this way I don't look like an idiot!

Maybe a better requirement than automatic power control would be FEC circuitry. Then the output power could be lowered - that's a form of power control!

Tony KE4AT0

9. Re: [SS:1338] Re: SS ID

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Fri, 2 May 1997 18:36:12 -0500
To: ss@tapr.org
Message-ID: <v0302092caf902a89c281@[208.134.134.40]>
Rendered body type: text/plain

>>yes in-band idong would be iding in the data payload, as with packet now.
>

>Perhaps we could call it "in-mode" IDing, to emphasize that the ID is sent
>with the same modulation mode. "In-band" IDing still implies only that the ID
>is in the same frequency band with the exotic mode.

Yes. After reading Lyle's and Bob's comments, "in-mode" matches what other

modes do (like ATV, Voice, etc) in describing how the ID is handled. I am redefining my term.

Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
<http://www.tapr.org/~wd5ivd>

10. Re: [SS-STA:357] A word on comments for the SS NPRM

From: Jeff King / Kathy King <jeff@mich.com>
Date: Fri, 02 May 1997 20:34:14 -0400
To: ss-sta@tapr.org, ss@tapr.org
Cc: dewayne@warpspeed.com
Message-ID: <2.2.32.19970503003414.009768a4@mail.mich.com>
Rendered body type: text/plain

At 10:52 AM 5/2/97 -0500, Dewayne Hendricks wrote:

>
> Comments are due at the FCC for the SS NPRM on Monday.

Due in there hot little hands or postmarked by Monday? If in their hands by Monday, what is the best way to insure this will happen considering it is Friday evening.... FAX or e-mail? By best way, I mean the way that it is taken the most seriously.

Regards,

| Jeff King Aero Data Systems |
| jeff@mich.com P.O. Box 510895 |
| (810)471-1787 Livonia, MI 48151 |
F(810)471-0279 United States

11. Re: [SS-STA:357] A word on comments for the SS NPRM

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Fri, 2 May 1997 17:52:03 -0700
To: Jeff King / Kathy King <jeff@mich.com>, ss-sta@tapr.org, ss@tapr.org
Message-ID: <v03102804af903c3d5209@[204.118.182.22]>
Rendered body type: text/plain

At 8:34 PM -0400 5/2/97, Jeff King / Kathy King wrote:

>At 10:52 AM 5/2/97 -0500, Dewayne Hendricks wrote:
>>
>> Comments are due at the FCC for the SS NPRM on Monday.
>

>Due in there hot little hands or postmarked by Monday? If in
>their hands by Monday, what is the best way to insure this
>will happen considering it is Friday evening.... FAX or e-mail?
>By best way, I mean the way that it is taken the most seriously.
>

It means that your comments have to be at the FCC on Monday. The Commission doesn't take formal comments sent via fax or email at this time. As for the delivery method, I leave that to you. There are still several options available to you that will get your comments to the Commission by Monday.

-- Dewayne

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Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com  
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM  
Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>  
Fax: (510) 770-9854 !  
~~~~~

12. Re: [SS:1340] SS Questions for Rule Filing

From: Lyle Johnson <lylej@azstarnet.com>
Date: Fri, 02 May 1997 19:17:40 -0700
To: ss@tapr.org
Message-ID: <3.0.32.19970502191654.00723bac@pop.azstarnet.com>
Rendered body type: text/plain

>>I have some questions, though, that I would like to ask: if a packet station
>is causing interference, how is that station supposed to be identified?

By the mode it is: packet.

>Can a weak signal guy or a DX'er identify the interfering packet station?

Yes, with a packet decoder (TNC or equivalent).

>I realize that packet sends an ID inside a packet header (so I was told), but
>do you need a special device to decode it?

Yes, you do. But a packet ID is perfectly legal (see Part 97.119(b)(3)).

>If this is so, then I see no reason why SS should be treated any different
>than other modes.

That seems perfectly logical to me, too. Please comment to the FCC!

>We should all follow the minimum power requirement for
>communication AT ALL TIMES, no matter what modulation method we choose.

Already the *law* for all modes, including SS. See Part 97.313(a).

>...Maybe a better requirement than automatic power control would be FEC
>circuitry. Then the output power could be lowered - that's a form of power
>control!

Part 97.313(a) again. Why have any *requirement* beyond this? Let the technical reasons drive the design, not administrative ones. I don't think the proposed automatic power control rule allows amateur roundtables, or broadcasts (like satellite telemetry) or a number of other traditional amateur radio applications.

Cheers,

Lyle

13. reply comments on RM-8737

From: Jeff King / Kathy King <jeff@mich.com>
Date: Sat, 03 May 1997 14:36:26 -0400
To: ss@tapr.org
Message-ID: <2.2.32.19970503183626.00bc2888@mail.mich.com>
Rendered body type: text/plain

Anyone have any idea how to locate reply comments to
8737 on the FCC web site? Specifically, I am looking
for the ARRL's. They are not on TAPR's site. Did every
search I could think of, but no luck.

Thanks

-Jeff

14. Re: [SS:1345] reply comments on RM-8737

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Sat, 3 May 1997 13:13:31 -0700
To: ss@tapr.org
Message-ID: <v03102804af914c3504e9@[204.118.182.22]>
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At 1:39 PM -0500 5/3/97, Jeff King / Kathy King wrote:
>Anyone have any idea how to locate reply comments to
>8737 on the FCC web site? Specifically, I am looking
>for the ARRL's. They are not on TAPR's site. Did every
>search I could think of, but no luck.

The answer is simple. Those comments are not on the FCC site. The FCC has only been posting comments on their site that have been made available to them in electronic form for selected rulemakings where they had setup a procedure for such submissions.

-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS  
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com  
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM

## 15. Re: [SS:1324] SS ID using "positive AM"

From: Phil Karn <karn@qualcomm.com>  
Date: Sat, 3 May 1997 23:34:39 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705040634.XAA01320@servo.qualcomm.com>  
Rendered body type: text/plain

>Why is it silly? A couple of messages back I saw a proposal to  
>increase the output power (by say 3dB) to ID(\*), what's wrong with  
>that? Increasing the power ensures that the ID is heard, the

What about high speed packet SS transmissions? They're not going  
to be long enough to CWID at any reasonable speed.

Phil

## 16. My SS comments to the FCC

From: Phil Karn <karn@qualcomm.com>  
Date: Sun, 4 May 1997 11:47:49 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705041847.LAA12950@servo.qualcomm.com>  
Rendered body type: text/plain

I went ahead and drafted comments of my own to the FCC on the SS NPRM.  
I Fedexed them out yesterday afternoon, and put them up on my own  
web page. See

<<http://people.qualcomm.com/karn/papers/ssnprmcomments.html>>

You'll probably be happy to see that I officially changed my mind  
regarding the automatic power control argument.

Phil

## 17. Re: SS ID

From: "Alan J. Eynon" <aeynon@micro.ti.com>  
Date: Sun, 4 May 1997 14:35:25 -0500 (CDT)  
To: ss@tapr.org  
Cc: aeynon@reliant.micro.ti.com  
Message-ID: <199705041935.OAA10735@yeshiva.micro.ti.com>  
Rendered body type: text/plain

Phil has raised some good points:

>Perhaps we could call it "in-mode" IDing, to emphasize that the ID is sent  
>with the same modulation mode. "In-band" IDing still implies only that the ID  
>is in the same frequency band with the exotic mode.

and

>The last thing we want are any hard-coded rules specifying the  
>spreading sequences we can use. That's what we're trying to get  
>away from in this proceeding.

although I have to add that these two goals may be contradictory from a  
spread spectrum identification point of view.

If, for instance, we are allowed to choose our own spreading sequences,  
then the only way for the authorities to find out which ones we're using  
would be for us to include the tap points as part of the identification  
in the packet header. But to get to the packet header, they would have  
to despread the signal, which implies knowing what the spreading sequence  
is. As much as they may do it themselves, governments don't take kindly  
to being put into these Catch-22 situations.

It would seem that we can only postulate two scenarios:

- \* In-mode identification, in which case the authorities will want to  
have some record (or assignment) of what spreading sequences we  
are using. The in-mode ID could therefore be very brief.
- \* Some form of external identification, in which case the external  
ID signal would have to indicate what spreading sequence we are  
using. I believe this coincides with Phil's original proposal to  
inject a portion of the carrier back into the spread signal. Any

in-mode identification also carried by the spread signal would therefore be needed only for data-derived purposes, such as routing.

We can't (read "won't be allowed to") have it both ways.

73  
Alan

---

## 18. Re: [SS:1329] Re: SS ID

From: Phil Karn <karn@qualcomm.com>  
Date: Mon, 5 May 1997 00:01:06 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705050701.AAA14158@servo.qualcomm.com>  
Rendered body type: text/plain

>is not as bad as you think. IS-95 (and Phil can correct me as I'm writing  
>without my notes in front of me) uses 1024 chip sequences, and the search  
>silicon brute forces each one in milliseconds. Even assuming that you have  
>to check the entire 1025 member family of that Gold code I proposed, it  
>should be do-able in seconds.

IS-95 uses a pair of spreading sequences, one short (32768 chips)  
and one very long ( $2^{41}-1$ ). Everybody uses the same sequences, but  
they're offset from each other in time.

You are talking about people who barely understand what a bit is, and  
you're expecting them to go out and buy or build some special device  
just so they can decode your transmissions to identify you in case you  
interfere with them? I think this is rather unlikely.

Having started this discussion, I don't really think any form of CWID  
should be mandatory. Hams have been tracking down unidentified QRM  
for years, the same will be true if there are problems with SS.

Phil

---

## 19. Re: SS ID

From: "Alan J. Eynon" <aeynon@micro.ti.com>  
Date: Mon, 05 May 1997 09:27:45 -0500  
To: ss@tapr.org  
Cc: aeyn@micro.ti.com  
Message-ID: <3.0.32.19970505092745.0069d458@pcmail.micro.ti.com>  
Rendered body type: text/plain

Sorry if this is a repetition; I've had some mailer difficulties.

Phil raises some good points:

>Perhaps we could call it "in-mode" IDing, to emphasize that the ID is sent  
>with the same modulation mode. "In-band" IDing still implies only that the ID  
>is in the same frequency band with the exotic mode.

and

>The last thing we want are any hard-coded rules specifying the  
>spreading sequences we can use. That's what we're trying to get  
>away from in this proceeding.

What I wanted to point out is that these two goals are mutually exclusive.

If, by some chance, we were allowed to pick any spreading sequence we  
wished, and at the same time were only required to use in-mode identification,  
the authorities then would be faced with the situation where (presumably)  
the only way to find out what spreading sequence we were using would be  
to look inside the packet header for the appropriate ID information. To  
do this, though, they would have to despread the signal - which requires  
knowing the spreading sequence. As much as they may create them themselves,  
governments normally don't take kindly to these Catch-22 situations.

It would seem that only two scenarios are viable:

- \* In-mode identification, in which case the authorities will want to have our spreading sequences on record, or otherwise limit us to an easily searched small number of sequences. Too, the spreading sequences would likely be a matter of public record, so that any listener with suitable equipment could despread them - just like with the other modes.

- \* External identification, in which the amateur ID and spreading

sequence generator tap points can be determined from some narrowband aspect of our signals. I believe this was what Phil was getting at in his earlier posting about reinjecting a portion of the carrier. The in-mode ID, if used, would only be data-driven, e.g. as a packet routing address.

You can't (read: "won't be allowed to") have it both ways.

73  
Alan

P.S. Question: wouldn't an in-mode ID then presume a standard packet header, data rate, link management protocol, etc?

Software Development Systems, Stafford, Texas Instruments, +1 281-274-2943

-----  
"I told you, I'm not allowed to argue unless you've paid!" -- Monty Python

---

## 20. Re: [SS:1349] Re: SS ID

From: "Alan J. Eynon" <aeynon@micro.ti.com>  
Date: Mon, 05 May 1997 10:41:40 -0500  
To: ss@tapr.org  
Message-ID: <3.0.32.19970505104139.006881b8@pcmail.micro.ti.com>  
Rendered body type: text/plain

Sorry for the repetition; the mailer sat on the first version for over 24 hours - for reasons known only to itself.

Software Development Systems, Stafford, Texas Instruments, +1 281-274-2943

-----  
"Now look, this isn't an argument; it's just contradiction." -- Monty Python

---

## 21. Re: [SS:1350] Re: SS ID

From: "Alan J. Eynon" <aeynon@micro.ti.com>  
Date: Mon, 05 May 1997 11:01:47 -0500  
To: ss@tapr.org  
Message-ID: <3.0.32.19970505110146.0069daa4@pcmail.micro.ti.com>  
Rendered body type: text/plain

Hi Phil,

Thanks for the IS-95 spreading sequence corrections:

>IS-95 uses a pair of spreading sequences, one short (32768 chips)  
>and one very long ( $2^{41}-1$ ). Everybody uses the same sequences, but  
>they're offset from each other in time.

Just out of curiosity, what's the mean acquisition time for the short sequence?

>You are talking about people who barely understand what a bit is, and  
>you're expecting them to go out and buy or build some special device  
>just so they can decode your transmissions to identify you in case you  
>interfere with them? I think this is rather unlikely.

Oh, I entirely agree. When I jumped in, the context of the discussion (as I understood it) was "what sort of identification schemes could we come up with, given a \$20-35 spending cap on the implementation?". I had been slanting my outlook towards the needs of FCC monitoring more than what other amateurs would use. As you mention:

>Having started this discussion, I don't really think any form of CWID  
>should be mandatory. Hams have been tracking down unidentified QRM  
>for years, the same will be true if there are problems with SS.

any spread signal causing interference could still be found by DF.  
Sorry for any confusion this caused.

Ready for next topic on which to violently agree. (^:

73  
Alan

Software Development Systems, Stafford, Texas Instruments, +1 281-274-2943

-----  
"DESTROY 99% OF KNOWN HOUSEHOLD PESTS WITH PRE-SLICED, RUSTPROOF, EASY

## 22. Re: [SS:1333] SS ID

From: Phil Karn <karn@qualcomm.com>  
Date: Mon, 5 May 1997 15:07:07 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705052207.PAA26578@servo.qualcomm.com>  
Rendered body type: text/plain

>If the sequence is truly a pseudo-noise sequence generated by shift  
>registers, well, there's only so many sequences of a given length. One  
>can test each candidate by a method called sequence estimation. Let's

There's a much easier way: the Massey-Berlekamp algorithm, widely used  
in decoding Reed-Solomon codes.

If the spreading sequence is generated by a linear feedback shift  
register (LFSR) of length L stages, then the Massey-Berlekamp  
algorithm can quickly determine the taps and the starting state with a  
sample of only 2L chips from the sequence. If the taps are already  
known and only the starting state is to be determined, then only L  
chips of the sequence are needed. For large values of L, this is  
obviously a lot shorter than the sequence itself, which is  $2^L - 1$  chips  
for a maximal length sequence.

Phil

---

## 23. Docket 97-12 Comments

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Mon, 5 May 1997 17:55:26 -0500  
To: " Spread Spectrum " <ss@tapr.org>  
Message-ID: <v03020923af94129d01ee@[208.134.134.40]>  
Rendered body type: text/plain

We have started the collection of comments from today's filings on Docket  
97-12 on <http://www.tapr.org/ss>

The following (listed below) are now available and we expect more to be  
made available in the coming weeks. These represent filings that the  
individuals/groups sent to us directly in electronic format (thanks!).  
Other selected filings will take time to get up on the web page, because  
copies must be made in Washington DC by our lawyers, mailed to a volunteer  
who then scans them before being made available on the web page. If you  
filed on Docket 97-12 and would like your comments or reply comments in the  
future posted with everyone else's, please send them to [wd5ivd@tapr.org](mailto:wd5ivd@tapr.org)

Comments on Docket 97-12 available include (as of 5/5/97):

Tucson Amateur Packet Radio Corp 5/5/97  
Lyle V. Johnson, WA7GXD 5/5/97  
Philip R. Karn, Jr, KA9Q 5/5/97  
Robert A. Buaas, K6KGS 5/5/97  
Central States VHF Society 5/5/97  
William A. Tynan, W3XO 5/5/97

Cheers - Greg Jones, WD5IVD  
President TAPR

-----  
Greg Jones, WD5IVD  
Austin, Texas  
[wd5ivd@tapr.org](mailto:wd5ivd@tapr.org)  
<http://www.tapr.org/~wd5ivd>  
-----

---

## 24. Re: [SS:1340] SS Questions for Rule Filing

From: Phil Karn <karn@qualcomm.com>  
Date: Mon, 5 May 1997 16:47:20 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705052347.QAA26905@servo.qualcomm.com>  
Rendered body type: text/plain

>I'd also like to know if someone knows of a study comparing the output  
>spectrum of a narrowband transmitter to a SS transmitter, both operating at  
>, say 50 watts? In other words, would a SS system transmitting at 100 watts  
>overpower a narrowband system transmitting at 10 watts, under ideal  
>conditions? Is there a linear relationship to this?

The key figure is "power spectral density", which is simply the total transmitter power divided by the bandwidth.

If you have a 100W transmitter spreading over 1 MHz, the power spectral density is  $100/1e6 = .0001$  W/Hz. If you have a 10 W narrowband transmitter operating in 3 KHz, then the power spectral density is  $.0033$  W/Hz, which is 33.3 times or 15.2 dB stronger. So if everything else is the same (path loss, etc), the narrowband signal will still be 15.2 dB stronger than the wideband signal in the narrowband receiver even though the total transmitter power for the wideband signal is 10 dB greater.

Phil

---

## 25. Re: [SS:1349] Re: SS ID

From: Phil Karn <karn@qualcomm.com>  
Date: Mon, 5 May 1997 17:33:15 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705060033.RAA27070@servo.qualcomm.com>  
Rendered body type: text/plain

>We can't (read "won't be allowed to") have it both ways.

Unless the FCC can be persuaded that any interference problems can be resolved without on-air identification of the interfering signal.

This could be done in any number of ways:

1. Conventional DFing (many hams have plenty of experience in tracking down wideband power line noise, which isn't identified).
2. "Offline" coordination and notification schemes, such as simply letting the local ham community know what you're up to in the way of SS transmissions by means of packet bulletins, newsletter articles, meetings, and the like.

Phil

---

## 26. Re: [SS:1353] Re: SS ID

From: Phil Karn <karn@qualcomm.com>  
Date: Mon, 5 May 1997 18:06:30 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705060106.SAA27142@servo.qualcomm.com>  
Rendered body type: text/plain

>Just out of curiosity, what's the mean acquisition time for the  
>short sequence?

A few seconds after power on. The phone takes about the same time to turn off the "NO SVC" led as a regular AMPS phone.

Every CDMA cell transmits a "pilot" using the same PN sequence, but with a fixed time offset that is maintained by a GPS receiver at each cell. When the mobile phone switches on, it searches the entire  $2^{15}$  chip sequence space looking for correlation peaks from the cell pilots. It picks the strongest one and begins tracking it.

The searching is done in special hardware that's part of the CDMA mobile station modem chip.

Phil

---

## 27. Re: [SS:1351] Re: SS ID

From: Lyle Johnson <lylej@azstarnet.com>  
Date: Mon, 05 May 1997 18:20:36 -0700  
To: ss@tapr.org  
Message-ID: <3.0.32.19970505181346.006e67b0@pop.azstarnet.com>  
Rendered body type: text/plain

>...What I wanted to point out is that these two goals are mutually exclusive.

I disagree. If the Amateur is using an unpublished,

no-one-can-figure-it-out sequence, then he can't talk to another Amateur station. If he can't communicate with anyone else, what's the point?

On the other hand, if he can communicate with others, then his spreading code must be available easily to other Amateurs -- and thus to the FCC or anyone else who cares to listen in.

If you try to make a case that this secretive Amateur is sending defense secrets across town to the foreign embassy, well, he is already outside the law and a regulation requiring him to CWID is also going to be ignored...no?

Cheers,

Lyle

---

## 28. Docket 97-12

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Mon, 5 May 1997 23:05:36 -0500  
To: "Spread Spectrum" <ss@tapr.org>  
Message-ID: <v03020932af945dfabc01@[208.134.134.40]>  
Rendered body type: text/plain

I just added two more comments to the page.

Greg

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>  
-----

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## 29. Re: SS ID

From: "Alan J. Eynon" <aeynon@micro.ti.com>  
Date: Tue, 06 May 1997 08:41:48 -0500  
To: ss@tapr.org  
Message-ID: <3.0.32.19970506084148.0069804c@pcmail.micro.ti.com>  
Rendered body type: text/plain

>I disagree. If the Amateur is using an unpublished.  
>no-one-can-figure-it-out sequence, then he can't talk to another Amateur  
>station. If he can't communicate with anyone else, what's the point?  
>  
>On the other hand, if he can communicate with others, then his spreading  
>code must be available easily to other Amateurs -- and thus to the FCC or  
>anyone else who cares to listen in.

Okay, I agree that if this coordination is a matter of public record (for instance, via some established procedure - such as announcing it on the local repeater) then the authorities have their basis for monitoring. If you and I were to arrange a spread spectrum test between ourselves without following such procedures, however, it might work perfectly well for us, but no one else would be able to tell what sorts of nefarious things we were sending through the air.

While it's true that 99% of the cases where someone wants to know the ID of that #\*~! interfering spread spectrum signal will be other amateurs (where DF would work well enough to isolate the offender), we have to ensure that the FCC (at least in principle) can check on the content of what we're sending. If only to make sure that we're not operating stations for the Republic of Texas. DF techniques by themselves don't relieve us of the responsibility to publicize the spreading sequences we're using.

Perhaps the point is overblown, but it's still my opinion that if the FCC isn't given a standard procedure for finding what spreading sequences an amateur is using (for instance, by knowing what repeater to listen to), they're going to insist that the spread transmission contain some narrowband feature that'll make it clear on-the-air.

73  
Alan

Software Development Systems, Stafford, Texas Instruments, +1 281-274-2943

-----  
"DESTROY 99% OF KNOWN HOUSEHOLD PESTS WITH PRE-SLICED, RUSTPROOF, EASY  
TO HANDLE, LOW CALORIE SIMPSON'S INDIVIDUAL EMPEROR STRINGETTES, FREE  
FROM ARTIFICIAL COLORING (AS USED IN HOSPITALS)." -- Monty Python

---

### 30. Re: [SS:1356] Re: SS Questions for Rule Filing

From: RLANIER@mailb.harris.com (RLANIER)  
Date: Tue, 6 May 1997 19:27:17 -0400  
To: ss@tapr.org  
Message-ID: <36fbe380@mailb.harris.com>  
Rendered body type: text/plain

>>I'd also like to know if someone knows of a study comparing the output  
>>spectrum of a narrowband transmitter to a SS transmitter, both operating at  
>>, say 50 watts? In other words, would a SS system transmitting at 100 watts  
>>overpower a narrowband system transmitting at 10 watts, under ideal  
>>conditions? Is there a linear relationship to this?

>The key figure is "power spectral density", which is simply the total  
>transmitter power divided by the bandwidth.

>If you have a 100W transmitter spreading over 1 MHz, the power  
>spectral density is  $100/1e6 = .0001$  W/Hz. If you have a 10 W  
>narrowband transmitter operating in 3 KHz, then the power spectral  
>density is  $.0033$  W/Hz, which is 33.3 times or 15.2 dB stronger. So  
>if  
>everything else is the same (path loss, etc), the narrowband signal will  
>still be 15.2 dB stronger than the wideband signal in the narrowband  
>receiver even though the total transmitter power for the wideband signal  
>is 10 dB greater.

>Phil

Hi Phil,

This is EXACTLY what I was looking for!

Thanks!

Tony KE4ATO

---

### 31. RE: [SS:1355] Docket 97-12 Comments

From: "Fortney, James T." <FortneyJ@ix.netcom.com>  
Date: Tue, 6 May 97 23:45:31 PDT  
To: ss@tapr.org  
Message-ID: <Chameleon.4.01.3B.970506234652.fortneyj@tok-ca8-49.ix.netcom.com>  
Rendered body type: text/plain

I can't find any comments at this address. Where are you hiding them?

- JimF K6IYK

>We have started the collection of comments from todays filings on Docket  
>97-12 on <http://www.tapr.org/ss>

>

>The following (listed below) are now available and we expect more to be  
>made available in the coming weeks. These represent filings that the  
>individuals/groups sent to us directly in electronic format (thanks!).  
>Other selected filings will take time to get up on the web page, because  
>copies must be made in Washington DC by our lawyers, mailed to a volunteer  
>who then scans them before being made available on the web page. If you  
>filed on Docket 97-12 and would like your comments or reply comments in the  
>future posted with everyone elses, please send them to [wd5ivd@tapr.org](mailto:wd5ivd@tapr.org)

>

>

>Comments on Docket 97-12 available include (as of 5/5/97):

>

> Tucson Amateur Packet Radio Corp 5/5/97  
> Lyle V. Johnson, WA7GXD 5/5/97  
> Philip R. Karn, Jr, KA9Q 5/5/97  
> Robert A. Buaas, K6KGS 5/5/97  
> Central States VHF Society 5/5/97  
> William A. Tynan, W3XO 5/5/97

>

>

>Cheers - Greg Jones, WD5IVD

>President TAPR

>

>

>-----

>Greg Jones, WD5IVD



>Austin, Texas  
>wd5ivd@tapr.org  
><http://www.tapr.org/~wd5ivd>  
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>  
>

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James T. Fortney  
E-mail: Jim@Fortney.org  
or: Jim@Fortney.com  
or: FortneyJ@ix.netcom.com  
Voice: 805.491.3916 or 1.500.FORTNEY  
AX.25: K6IYK@K6IYK.#SCA.CA.USA.NOAM  
MARSAMTS: AAA9CS@AT9TCS.AMARS.DOD  
FAX: 805.491.0319  
Snail: P.O. Box 3419  
Camarillo, CA 93011-3419  
-----

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## 32. Re: [SS:1363] RE: Docket 97-12 Comments

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Wed, 7 May 1997 02:20:10 -0500  
To: ss@tapr.org  
Message-ID: <v03020928af95dd7edc39@[208.134.134.40]>  
Rendered body type: text/plain

Did you try the link called

"Spread Spectrum Rule Changes (RM-8737 & Doc. 97-12)"

It is the first on at the very top the one that say Updated to the right.

Cheers - Greg

>I can't find any comments at this address. Where are you hiding them?  
>  
>- JimF K6IYK  
>  
>>We have started the collection of comments from todays filings on Docket  
>>97-12 on <http://www.tapr.org/ss>  
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>>The following (listed below) are now available and we expect more to be  
>>made available in the coming weeks. These represent filings that the  
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>>  
>>Comments on Docket 97-12 available include (as of 5/5/97):  
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>> Tucson Amateur Packet Radio Corp 5/5/97  
>> Lyle V. Johnson, WA7GXD 5/5/97  
>> Philip R. Karn, Jr, KA9Q 5/5/97  
>> Robert A. Buaas, K6KGS 5/5/97  
>> Central States VHF Society 5/5/97  
>> William A. Tynan, W3XO 5/5/97  
>>  
>>  
>>  
>>Cheers - Greg Jones, WD5IVD  
>>President TAPR  
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>>-----  
>>Greg Jones, WD5IVD  
>>Austin, Texas  
>>wd5ivd@tapr.org  
>><http://www.tapr.org/~wd5ivd>  
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>>  
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>James T. Fortney  
>E-mail: Jim@Fortney.org  
> or: Jim@Fortney.com  
> or: FortneyJ@ix.netcom.com  
>Voice: 805.491.3916 or 1.500.FORTNEY  
>AX.25: K6IYK@K6IYK.#5CA.CA.USA.NOAM  
>MARSAMTS: AAA9CS@AT9TCS.AMARS.DOD  
>FAX: 805.491.0319  
>Snail: P.O. Box 3419  
> Camarillo, CA 93011-3419  
>-----

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>  
-----

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### 33. Re: [SS:1354] Re: SS ID

From: Terry Giles <terry@ramar.co.uk>  
Date: Wed, 7 May 1997 9:29:40 +0100  
To: ss@tapr.org  
Message-ID: <42061C3101EB3300@mailgate.ramar.co.uk>  
Rendered body type: text/plain  
  
> To: SS@SMTP {ss@tapr.org}  
> From: KARN@SMTP (Phil Karn) {karn@qualcomm.com}  
> Reply-to: SS @ SMTP {ss@tapr.org}  
> Subject: [SS:1354] Re: SS ID  
> Date: 5-May-97 17:10:05 -0500  
  
>  
> There's a much easier way: the Massey-Berlekamp algorithm, widely used  
> in decoding Reed-Solomon codes.  
>  
>  
>  
> Phil  
>  
>  
Phil

I am very interested in fast acquisition schemes for DSSS and would appreciate any references you have to the Massey-Berlekamp algorithm.

73 de G4CDY

Terry Giles  
RAMAR Technology Ltd  
Airport House, Purley Way  
Surrey CR0 0XZ UK  
+44 (0) 181 781 1959  
+44 (0) 181 781 1958 FAX  
e-mail [terry@ramar.co.uk](mailto:terry@ramar.co.uk)

---

### 34. Re: [SS:1357] Re: SS ID

From: Jack Taylor <n7oo@goodnet.com>  
Date: Wed, 7 May 1997 10:48:55 -0700 (MST)  
To: ss@tapr.org  
Message-ID: <Pine.GS0.3.95.970507100302.10542A-100000@goodguy>  
Rendered body type: text/plain  
  
On Mon, 5 May 1997, Phil Karn wrote:  
  
> >We can't (read "won't be allowed to") have it both ways.  
>  
> Unless the FCC can be persuaded that any interference problems can  
> be resolved without on-air identification of the interfering signal.  
>  
> This could be done in any number of ways:  
>  
> 1. Conventional DFing (many hams have plenty of experience in tracking  
> down wideband power line noise, which isn't identified).  
>  
> 2. "Offline" coordination and notification schemes, such as simply

> letting the local ham community know what you're up to in the way of  
> SS transmissions by means of packet bulletins, newsletter articles,  
> meetings, and the like.  
>  
> Phil

My observation is that very few hams in this area have the technical capability (or interest) in tracking down ANY interference. There was a time about 15 - 20 years ago, a group got together to localize cable leakage on one of the 2M frequencies, but this was pretty easy to locate as it was a constant carrier.

There currently exists intermod interference at a number of mountain-top repeater sites. The solution has been to install PL as a means to reduce the annoyance. The PL approach of course is just a band aid for the real problem. Haven't heard of any effort to find the cause of the intermod, let alone resolve it.

As for power line interference, the usual approach is to call the power company and let them investigate.

Does anyone have first-hand knowledge of what SS interference sounds like on a narrow-band RX? Would it be of such duration as to open the squelch at co-located repeater sites? Perhaps not a problem if the repeater is PL'ed, but what about when someone with a weak signal (with PL) access's the repeater?

Assuming there is no SS ID requirement that's detectable by the narrow band RX, we need to identify what techniques and equipment required by the narrow band group to track down SS QRM.

When we are talking in-mode ID'ing in terms of packet and other narrow band modes, aren't we comparing apples to oranges? Is it realistic for concerned narrow-banders to go out and buy the latest wideband technology just so THEY can identify the offending SS QRM? If the shoe is on YOUR foot, would YOU be willing to make this investment? If the costs for doing so were low, you might be willing. But currently we're talking in the kilobuck range for an SS 'monitor'.

I didn't see a stampede by the digital HFers to invest that much in the comparably priced HAL PCI-4000 Clover board, when it was introduced. Same is true of the Pactor II modems. Even the lower priced HAL P-38 boards aren't being snapped up by the amateur community.

Like any new mode, there's going to be opposition to implimenting it. My view is this opposition would be substantially softened if there's some way of providing an ID that wouldn't impose specialized equipment procurement on the existing narrow band owners. After all, isn't an SS ID "just software"?

73 de Jack

---

## 35. Re: [SS:1365] Re: SS ID

From: Phil Karn <karn@qualcomm.com>  
Date: Wed, 7 May 1997 17:58:52 +0000 (UTC)  
To: ss@tapr.org  
Message-ID: <m0wPAzM-000RwsC@laptop.ka9q.ampr.org>  
Rendered body type: text/plain

>I am very interested in fast acquisition schemes for DSSS and would  
>appreciate any references you have to the Massey-Berlekamp algorithm.

Spread spectrum acquisition is discussed at length in the usual references on spread spectrum (Dixon, Viterbi, etc).

The Massey-Berlekamp algorithm is described in most textbooks on coding theory, particularly those that cover the Reed-Solomon code. Lin & Costello and Blahut are two good examples.

Phil

---

## 36. Re: SS ID

From: "Alan J. Eynon" <aeynon@micro.ti.com>  
Date: Wed, 07 May 1997 16:26:02 -0500  
To: ss@tapr.org, ss@tapr.org  
Message-ID: <3.0.32.19970507162602.0069ba3c@pcmail.micro.ti.com>  
Rendered body type: text/plain

Hi Jack,

>Like any new mode, there's going to be opposition to implimenting it. My  
>view is this opposition would be substantially softened if there's some  
>way of providing an ID that wouldn't impose specialized equipment  
>procurement on the existing narrow band owners. After all, isn't an SS ID  
>"just software"?

I think the gist of one of Phil's ideas was that we could put a CW identifier in the spread spectrum signal, so the ID would be external to the spreading. I also recall that he specified that the power of CW ID be no greater than the power spectral density of the spread signal. This is so that if the spread signal causes no interference, neither will the CW ID, whereas if the spread signal \*is\* causing detectable interference (such as breaking squelch), then the CW ID should also be detectable with a narrowband receiver.

One interesting scenario I see is that these spread signal might be many hundreds of kilohertz (or even several megahertz) wide. The CW carrier only occupies a few hertz. So the spread signal's CW ID might be located quite far away from the poor operator who's receiving the interference, and they're going to have to "feel" their way along the spread signal by ear (it's essentially going to sound like white noise, or a general increase in the background noise of the band) until they hit the CW ID. So even this external ID signal isn't going to make it easy to identify the interferer.

73  
Alan

---

## 37. Re: SS ID

From: Lyle Johnson <lylej@azstarnet.com>  
Date: Wed, 07 May 1997 19:37:01 -0700  
To: ss@tapr.org  
Message-ID: <3.0.32.19970507190614.006e9e10@pop.azstarnet.com>  
Rendered body type: text/plain

Jack,

>My observation is that very few hams in this area have the technical  
>capability (or interest) in tracking down ANY interference...

Isn't it reasonable to assume that if people aren't bothered by the interference enough to track it down, then it isn't really bothering them?

>There currently exists intermod interference at a number of mountain-top  
>repeater sites...Haven't heard of any effort to find the cause of the  
>intermod, let alone resolve it.

This is just a case of too many transmitters too close together. It is sad that people put up with it, because the sources and causes are usually within a few hundred feet of the site... no DFing required, just decent system engineering and maintenance!

>Does anyone have first-hand knowledge of what SS interference sounds like  
>on a narrow-band RX? Would it be of such duration as to open the squelch  
>at co-located repeater sites? Perhaps not a problem if the repeater is  
>PL'ed, but what about when someone with a weak signal (with PL) access's  
>the repeater?

There will be many forms of SS - frequency hoppers, DSSS, combinations, etc. If they are detectable at all, their "signature" it will depend entirely on the type of SS emission and the type of narrowband receiver (FM? SSB? CW with 100 Hz filter? DSP filter box in audio line?).

>Assuming there is no SS ID requirement that's detectable by the narrow band  
>RX, we need to identify what techniques and equipment required by the  
>narrow band group to track down SS QRM.

I think this is actually pretty easy:

1) the receiver that's experiencing the interference (or another that also experiences it)

2) a directional antenna

3) standard DF techniques then apply. In other words, if it is interfering with narrowband modes, pretend it is a narrowband signal and go find it! There is no equipment or techniques required other than what

one would presently use to track down interference.

>When we are talking in-mode ID'ing in terms of packet and other narrow  
>band modes, aren't we comparing apples to oranges? Is it realistic for  
>concerned narrow-banders to go out and buy the latest wideband technology  
>just so THEY can identify the offending SS QRM?

If I am running weak-signal SSB on 432.1 and hear interference, I need to track it down. Since these are UHF and microwave frequencies, if I am doing weak signal work, I have a directional antenna, so I can start to track it down with my rotator. I can call a couple of my local buddies to tune in and aim their antennas, too. We'll find the source pretty quickly.

>If the shoe is on YOUR foot, would YOU be willing to make this investment?  
If the costs >for doing so were low, you might be willing. But currently we're talking in  
>the kilobuck range for an SS 'monitor'.

Actually, there is no SS monitor for Amateur SS operation because there is no Amateur SS operation to speak of. If I heard bothersome interference and couldn't identify it (maybe it is SS, maybe it isn't) then I have to go look for it. Like defending a patent, it is up to me to seek out the infringer and advise him of the interference he is causing.

I don't run a lot of modes, and can't identify them, but if they bother me it is up to me to find them. In the end, I don't really care \*who\* they are or what callsign they are using, I care \*where\* they are so I can track them down. If I am able to communicate with them, then I can ask them directly without tracking them down.

But all of this presupposes that there is an army of SS stations \*nearby\* and they are secret so no one knows they are running SS.

>I didn't see a stampede by the digital HFers to invest that much in the  
>comparably priced HAL PCI-4000 Clover board, when it was introduced.  
>Same is true of the Pactor II modems. Even the lower priced HAL P-38  
>boards aren't being snapped up by the amateur community.

I fail to see the connection? I can't copy CLOVER or PACTOR. I didn't choose to buy the equipment.

But, what if I choose to only use a 1 Hz CW filter because I am a narrowband mounbounce operator? I can't hear a CLOVER "CWID" (I know it's not required). So, how can I find this station that's interfering with my 1 Hz CW operation? I can't. But, is it fair for me to insist that everyone send CW at 1 Hz so I can identify them?

>Like any new mode, there's going to be opposition to implimenting it. My  
>view is this opposition would be substantially softened if there's some  
>way of providing an ID that wouldn't impose specialized equipment  
>procurement on the existing narrow band owners. After all, isn't an SS ID  
>"just software"?

No, it is much more than that. If I have a 1/4 megabit/sec packet link on SS, I can send a lot of information in a millisecond. But, a 20 WPM CWID will take me 3-4 seconds (I have six-character callsign). And that assumes that people operating in UHF and microwave are 20 WPM proficient with CW. Most aren't. And, in fact, many have a license that specifically states they don't know CW. So, a CWID is certainly inappropriate.

Let's look at this from another viewpoint.

SS is suppoed to be narrowband "invisible". Let's assume I have a DSSS radio that normally occupies a 20 MHz slice of 2.4 GHz (a likely band for SS operation).

First, of course, is that fact that there are almost no narrowband users with which I can interfere.

But, more to the point, let's say I decide to send a CWID. Do I raise my power wnoough so that any nafrrrowband receiver tuned to any portion of that 20 MHz slice of spectrum can copy me? No, that would force me to create a HUGE amount of potential interference. So, I decide that, since my spectrum is 20 MHz wide, I will send a 20 WPM CWID exactly 4.9152 MHz up from the bottm edge of my occupied spectrum. But, you are a narrowband CW person. How are you going to find my CWID if you are experienceing interference 9.73 MHz down from the top edge of my spectrum slice?

The FCC rewquirement to use the minimum bandwidth for the intended

communication indicates, that for sending a CWID for a narrowband station, I \*can't\* modulate my entire SS envelope and occupy the whole spectrum slice, I \*must\* use a carrier that is reasonably pure, etc. You're just not going to be able to find my CWID even if I am required to send it!

I think it becomes clear that sending a narrowband ID on a wideband mode just isn't realizable on a practical basis.

Let's look at another example.

SS is only allowed on UHF and microwave frequencies at present. Any interference is going to be from someone nearby. In the early days, while things are very experimental, there are only going to be one or two people on the air near any particular other ham, and probably fewer. And, once they get the equipment up and running, they are going to tell anyone who cares to listen what they are doing, to encourage activity because they don't just want to communicate between two stations. (If they do, at these frequencies they are using very directional antennas anyway, so unless you are exactly in their path, AND listening at the instant they are transmitting AND their transmission is somehow interfering with your reception AND the duration of their transmission is long enough for you to realize it is even happening [not likely at 2 or 10 megabits/sec, you won't be aware of them anyway, which is much of the point of SS operation -to invisibly share spectrum] you won't be aware of them and they won't be causing you interference.)

Think back to the first days of packet (you were a pioneer in Sierra Vista). We got on the local repeaters, started clubs, called meetings, talked to ham clubs - we ADVERTISED our presence to attract other stations.

So, in the early days, we got phone calls from folks who thought the repeater intermod was a packet station. But it wasn't a big deal and people knew who was on the air with packet. They knew who to call if they thought there was a packet "intruder" on "their frequency."

If SS ever catches on like packet, the same path will be followed. It's always been this way for any new mode on VHF or UHF. And these \*ARE\* local communications facilities, not HF ionospheric DX stations.

After a while, anyone who wanted one could get a TNC for a hundred bucks (or a baycomm modem for \$49).

When FM was new (I used to operate 2m AM but I won't say how long ago THAT was) you could buy an HR-2 for cheap - or QSY to a non-FM frequency.

When SS catches on enough to be even a remote possibility of being a problem, there will be a TAPR or a Hamtronics or some way to get a basic radio for CHEAP. And if SS causes much interference to narrowband users, it won't catch on.

I just don't see the problem. And I don't see why an SS station should be required to interfere with narrowband stations to send an ID, when the most prevalent cause of narrowband interference from SS users will then be the ID!

Another \$0.02 :-)

Cheers,

Lyle

>

>73 de Jack

>

>

>

>

>

>

>

>

>

---

### 38. Re: [SS:1368] Re: SS ID

From: Lyle Johnson <lylej@azstarnet.com>  
Date: Wed, 07 May 1997 19:37:11 -0700  
To: ss@tapr.org  
Message-ID: <3.0.32.19970507193444.00736b28@pop.azstarnet.com>  
Rendered body type: text/plain

>One interesting scenario I see is that these spread signal might be  
>many hundreds of kilohertz (or even several megahertz) wide. The CW  
>carrier only occupies a few hertz. So the spread signal's CW ID might  
>be located quite far away from the poor operator who's receiving the  
>interference, and they're going to have to "feel" their way along the  
>spread signal by ear (it's essentially going to sound like white noise,  
>or a general increase in the background noise of the band) until they  
>hit the CW ID. So even this external ID signal isn't going to make it  
>easy to identify the interferer.

Alan,

And if they have to dwell every receiver-IF-filter-width for 10 minutes. AWE  
are now tuning 500 Hz to 2 kHz every ten minutes, trying to cover several  
MHz.

It's easier to just DF the thing! And it's faster to wait for the next  
club meeting and vote in a measure to buy a foxhunting outfit, and train  
yourself how to use it (500 Hz/ten minutes = 3 kHz/hr. That's 333.3  
hours/MHz, 6666.7 hours for a 20 MHz swath, or 277.8 days. Hope the SS  
interferer is patient enough to continuously send his CWID every ten  
minutes for 9 months, because if he doesn't, you have to tune it all over  
again...).

A \*perhaps\* practical way is to set aside a single CW-width channel on  
every band on which SS emissions are allowed and have stations on the band  
send a weak CWID every ten minutes while they are in operation. And, if  
the mode gets popular, you still have to DF because everyone is on the  
\*same\* frequency -- and how do you correlate a particular CWID with an SS  
emission that is likely not coincident -- and if it is data, likely only  
lasts a millisecond or two anyway?

Folks, it just is not technically practical, no matter how good the social  
arguments, to use a narrowband ID on an SS signal.

I think I'm up to \$0.06 now :-)

Hey, I'm having fun!

Cheers,

Lyle

---

### 39. Give me a info. about multi-user detection

From: hskim@cip-snowwhite.soongsil.ac.kr  
Date: Thu, 8 May 1997 12:09:54 +0900  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <01BC5BA8.BDE89160@cip10herb.soongsil.ac.kr>  
Rendered body type: text/plain

-----Original Message-----

From: Phil Karn [SMTP:karn@qualcomm.com]  
Sent: Thursday, May 08, 1997 6:14 AM  
To: ss@tapr.org  
Subject: [SS:1367] Re: SS ID

[±êÇD%°] Hello!  
I'm a graduate school student in Seoul, South Korea  
I learn CDMA recently.  
but lack of info.  
if you will give me information or paper or etc, e-mail to me  
Thank you very much for reading this ugly mail.  
bye...

---

### 40. Re: [SS:1366] Re: SS ID

From: Tony McConnell <n3jly@erols.com>  
Date: Thu, 8 May 1997 00:03:35 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <199705080403.AAA08142@smtp2.erols.com>  
Rendered body type: text/plain

> Is it realistic for  
>concerned narrow-banders to go out and buy the latest wideband technology  
>just so THEY can identify the offending SS QRM? If the shoe is on YOUR  
>foot, would YOU be willing to make this investment? If the costs for  
>doing so were low, you might be willing. But currently we're talking in  
>the kilobuck range for an SS 'monitor'.

one could ask- if i don't have a tnc what would i do if being interfered

with by packets? today in the US these don't have morse ids. you'd call out for someone with a tnc to decode it for you. i surely would not buy a tnc just to figure out who was interfering with me(but i guess now i know why the local candy store won't take returns).

those of us interested in ss are interested in what it can do for us. we don't just need another mode to try, if ss isn't working for the community as a whole then why would any of us want it? now please understand i can't accept unfounded fears on the part of the uniformed to prevent experimentation. but if well planned and executed experiments show it doesn't have a place in amatuer radio, that would be a different matter. i personally believe that it will find a place, one that has been lacking.

obtw, in the same letter that the above quote is exerpted from, the question was asked "What would a spread spectrum signal sound like to a narrow receiver?". i'd think that may not be all that easy to answer. the parameters of the transmission would have a great effect on how it would sound. i was playing with a 0dBm dsss signal with 100kcps of p/n on the bench, with this going into a service monitor unattenuated it sounded much like a cellular signaling channel to the ear. normally my service monitor will receive signals off the air to well below -100 dBm, but with 50 dB of attenuation i could not hear the spread signal at all(but if the signal was not spread i could hear it well). amazing to me the pretty picture on the spectrum analyzer looks just like in the books.

---

#### 41. Re: [SS:1372] Re: SS ID

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Thu, 8 May 1997 02:38:39 -0500  
To: ss@tapr.org  
Message-ID: <v0302090baf9732472c6d@[192.168.1.2]>  
Rendered body type: text/plain

```
>> Is it realistic for
>>concerned narrow-banders to go out and buy the latest wideband technology
>>just so THEY can identify the offending SS QRM? If the shoe is on YOUR
>>foot, would YOU be willing to make this investment? If the costs for
>>doing so were low, you might be willing. But currently we're talking in
>>the kilobuck range for an SS 'monitor'.
>
>one could ask- if i don't have a tnc what would i do if being interfered
>with by packets? today in the US these don't have morse ids. you'd call out
>for someone with a tnc to decode it for you. i surely would not buy a tnc
>just
>to figure out who was interfering with me(but i guess now i know why the
>local
>candy store won't take returns).
>
>those of us interested in ss are interested in what it can do for us. we
>don't
>just need another mode to try, if ss isn't working for the community as a
>whole
>then why would any of us want it? now please understand i can't accept
>unfounded
>fears on the part of the uniformed to prevent experimentation. but if well
>planned
>and executed experiments show it doesn't have a place in amatuer radio, that
>would
>be a different matter. i personally believe that it will find a place, one
>that has
>been lacking.
>
```

Which means everyone on this list that feels this way, REALLY MUST comment on this in the reply comments to Docket 97-12. This is our ONLY chance now to get these changed. If the FCC doesn't hear from those that can express these thoughts and the comments filed are equally balanced, then we will end up with rules that will seriously limit experimentation and later



implementation of SS within Part 97.

Be sure to read over the comments filed and if you see something in those comments that you don't like. File something in the reply comments that just covers that point. Like maybe the issue of logging and keeping the logs for over a year ? or maybe the comments about limiting Spread Spectrum to what someone termed 'narrow band' operating limits.

The process at the FCC is a democratic one. Thus, the majority of filings have a voice in what finally happens.

Cheers - Greg

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
http://www.tapr.org/~wd5ivd  
-----

---

## 42. Linear translator and DSSS

From: Jeff King / Kathy King <jeff@mich.com>  
Date: Thu, 08 May 1997 04:53:41 -0400  
To: ss@tapr.org  
Message-ID: <2.2.32.19970508085341.00744d50@mail.mich.com>  
Rendered body type: text/plain

I think I know the answer to this already (yes) but I will ask anyways.

Can multiple independent (different PN sequences) DSSS signals pass through a linear translator (i.e. a analog satellite) and be received properly? The assumptions made are the collective energy of all the DSSS stations is not driving the translator into hard limiting.

Thanks

Regards,

-----  
| Jeff King            Aero Data Systems |  
| jeff@mich.com      P.O. Box 510895    |  
| (810)471-1787      Livonia, MI 48151   |  
| F(810)471-0279     United States      |  
-----

---

## 43. Re: [SS:1346] Re: reply comments on RM-8737

From: Jeff King / Kathy King <jeff@mich.com>  
Date: Thu, 08 May 1997 05:18:49 -0400  
To: ss@tapr.org  
Message-ID: <2.2.32.19970508091849.00743338@mail.mich.com>  
Rendered body type: text/plain

At 03:16 PM 5/3/97 -0500, Dewayne Hendricks wrote:  
>At 1:39 PM -0500 5/3/97, Jeff King / Kathy King wrote:  
>>Anyone have any idea how to locate reply comments to  
>>8737 on the FCC web site? Specifically, I am looking  
>>for the ARRL's. They are not on TAPR's site. Did every  
>>search I could think of, but no luck.

>  
>        The answer is simple. Those comments are not on the FCC site. The  
>FCC has only been posting comments on their site that have been made  
>available to them in electronic form for selected rulemakings where they  
>had setup a procedure for such submissions.  
>  
>--- Dewayne

Let me be a bit broader then, I'm interested in seeing the comments, all of the comments before offering a reply. Short of driving to the FCC in Washington, how might one accomplish this? I believe Greg indicated to me the reason the ARRL's reply comments to RM-8737 was not on the TAPR site is that it wasn't scanned in.

If you can obtain paper copies, I can scan (OCR) them in for you.

Certainly, there is quite a bit to comment on in what I see so far on the TAPR WEB site, I'd just like to make sure I'm seeing it all before I reply.

Regards,

-----

| Jeff King            Aero Data Systems |  
| jeff@mich.com      P.O. Box 510895    |  
| (810)471-1787      Livonia, MI 48151    |  
| F(810)471-0279     United States        |  
-----

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#### 44. Quick and Dirty SS ID ??

From: RLANIER@mailb.harris.com (RLANIER)  
Date: Thu, 8 May 1997 08:13:02 -0400  
To: ss@tapr.org  
Message-ID: <371c3110@mailb.harris.com>  
Rendered body type: text/plain

Hey guys,

Why don't we ID SS by the way it sounds? It seems to me that most modes have a particular "sound" to them (packet and RTTY come to mind). Then why not ID SS by its sound? I've seen on this list a description of SS as a constant "buzz." If so, we can use direction finding equipment and locate the source.

If this isn't feasible, why not?

Tony    KE4ATO

---

#### 45. Re: [SS:1373] Re: SS ID

From: RLANIER@mailb.harris.com (RLANIER)  
Date: Thu, 8 May 1997 08:36:46 -0400  
To: ss@tapr.org  
Message-ID: <371c8b20@mailb.harris.com>  
Rendered body type: text/plain

>Which means everyone on this list that feels this way, REALLY MUST comment  
>on this in the reply comments to Docket 97-12. This is our ONLY chance now  
>to get these changed. If the FCC doesn't hear from those that can express  
>these thoughts and the comments filed are equally balanced, then we will  
>end up with rules that will seriously limit experimentation and later  
>implementation of SS within Part 97.

>Be sure to read over the comments filed and if you see something in those  
>comments that you don't like. File something in the reply comments that  
>just covers that point. Like maybe the issue of logging and keeping the  
>logs for over a year ? or maybe the comments about limiting Spread  
>Spectrum to what someone termed 'narrow band' operating limits.

>The process at the FCC is a democratic one. Thus, the majority of filings  
>have a voice in what finally happens.

>Cheers - Greg

Greg,

You bring up a good point: filing comments to the FCC. I was not able to write my comments and mail them to the FCC before the deadline. Can I still reply to 97-12 or do I have to wait?

I really want to voice my opinion to the U.S. Government!

Tony    KE4ATO

---

#### 46. Re: [SS:1377] Re: SS ID

From: Dwayne Hendricks <dwayne@warpspeed.com>  
Date: Thu, 8 May 1997 06:27:37 -0700  
To: ss@tapr.org  
Message-ID: <v03102810af978529d10d@[204.118.182.22]>  
Rendered body type: text/plain

At 7:43 AM -0500 5/8/97, RLANIER wrote:

> You bring up a good point: filing comments to the FCC. I was not able  
> to write my comments and mail them to the FCC before the deadline. Can  
> I still reply to 97-12 or do I have to wait?

You don't have to wait for anything. Just file whatever comments you have as soon as you can.

-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>
Fax: (510) 770-9854 !
~~~~~

---

## 47. Re: Re: SS ID

From: "James D. Cronin" <jdc@dos.nortel.com>  
Date: Thu, 8 May 1997 09:50:57 -0400  
To: ss@tapr.org  
Message-ID: <9705080950.ZM3433@sun144>  
Rendered body type: text/plain

Does anybody around here talk about spread spectrum radio? I subscribed to the mailing list expecting to learn something about spread spectrum from those who have used it. Or information on spread spectrum products we could use for our packet systems. Or just stuff that is "good to know."

Instead we have a flamfest among a small group of people on spread spectrum IDing.

Are there any mailing lists where spread spectrum radio, projects and products are discussed? Or can we possibly talk about that stuff here?

73..Jim N2VNO

---

## 48. 2.4 GHz FH wireless lan id's

From: hbaker@netcom.com (Henry G. Baker)  
Date: Thu, 8 May 1997 08:33:30 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705081533.IAA13979@netcom19.netcom.com>  
Rendered body type: text/plain

I was talking with a vendor of 2.4GHz FH wireless LAN hardware at Interop in Los Vegas yesterday, and he told me that a big holdup to using this hw in Japan was their requirement for some sort of ID. Apparently, this same 2.4GHz band is utilized almost world-wide without ID, and only Japan requires some sort of ID. Apparently, this ID issue has not yet been resolved for this band in Japan yet.

--

Henry Baker  
www/ftp directory URL:  
ftp://ftp.netcom.com/pub/hb/hbaker/home.html

---

## 49. Re: [SS:1375] Re: reply comments on RM-8737

From: Dewayne Hendricks <dewayne@warpspeed.com>  
Date: Thu, 8 May 1997 08:40:02 -0700  
To: ss@tapr.org  
Message-ID: <v03102811af97a1366975@[204.118.182.22]>  
Rendered body type: text/plain

At 4:25 AM -0500 5/8/97, Jeff King / Kathy King wrote:  
>Let me be a bit broader then, I'm interested in seeing the comments, all  
>of the  
>comments before offering a reply. Short of driving to the FCC in  
>Washington, how  
>might one accomplish this? I believe Greg indicated to me the reason the  
>ARRL's  
>reply comments to RM-8737 was not on the TAPR site is that it wasn't scanned  
>in.  
>If you can obtain paper copies, I can scan (OCR) them in for you.

As has been stated earlier, TAPR will make as many as the comments/reply comments available on our website as soon as we can. We don't guarantee to put all of them up as the effort is limited by the time available of the volunteers who have offered to help in the effort. Thanks for your offer to help, but we have enough people allocated to the effort for the time being.

-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>
Fax: (510) 770-9854 !
~~~~~

---

## 50. Re: [SS:1379] Re: Re: SS ID

From: Bob Lorenzini <hwm@netcom.com>  
Date: Thu, 8 May 1997 09:07:45 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <Pine.LNX.3.95.970508085711.159B-100000@mm.wd6dod.ampr.org>  
Rendered body type: text/plain

On Thu, 8 May 1997, James D. Cronin wrote:

> Does anybody around here talk about spread spectrum radio? I subscribed  
  
> Instead we have a flamfest among a small group of people on spread spectrum  
> IDing.

Be patient, at the moment we are running up against a deadline for  
comments on something that could have long lasting negative implications  
for SS. This is most important at this time.

Bob - wd6dod

---

## 51. Re: [SS:1381] Re: reply comments on RM-8737

From: Jeff King / Kathy King <jeff@mich.com>  
Date: Thu, 08 May 1997 13:46:12 -0400  
To: ss@tapr.org, dewayne@warpspeed.com  
Message-ID: <2.2.32.19970508174612.00a6b574@mail.mich.com>  
Rendered body type: text/plain

At 10:42 AM 5/8/97 -0500, Dewayne Hendricks wrote:  
>At 4:25 AM -0500 5/8/97, Jeff King / Kathy King wrote:  
>>Let me be a bit broader then, I'm interested in seeing the comments, all  
>>of the  
>>comments before offering a reply. Short of driving to the FCC in  
>>Washington, how  
>>might one accomplish this? I believe Greg indicated to me the reason the  
>>ARRL's  
>>reply comments to RM-8737 was not on the TAPR site is that it wasn't scanned  
>>in.  
>>If you can obtain paper copies, I can scan (OCR) them in for you.

> As has been stated earlier, TAPR will make as many as the  
>comments/reply comments available on our website as soon as we can. We  
>don't guarantee to put all of them up as the effort is limited by the time  
>available of the volunteers who have offered to help in the effort. Thanks  
>for your offer to help, but we have enough people allocated to the effort  
>for the time being.  
>  
>-- Dewayne

Your not understanding my question. I'm \*NOT\* asking or expecting  
TAPR to provide me those comments, I'm asking how 'Joe Q. Citizen'  
can get ahold of them so he/she can make some intelligent reply  
comments. At this point I'm trying to save the expense/runaround of  
calling the FCC in Washington on the phone to ask this same  
question.... and I suspect you know the answer.

The reason I volunteered to help TAPR was I thought there wasn't enough  
manpower based on the missing comments/reply comments on RM-8737. One  
of the comments were missing, and 7 of the reply comments were missing,  
including the ARRL's. I appreciate the fact that TAPR is a volunteer  
organization, none-the-less I think it is important to make comments  
based on a full and complete set of information. Also, since many of the same  
players that were involved in RM-8737 are now involved in 97-12, it helps to  
read the previous reply comments to anticipate comments/reply  
comments these folks might make. Hence my interest in learning  
how I can gain access to these in the event TAPR is unable to provide a  
complete set of comments on the rule making.

-Jeff

## 52. Re: [SS:1379] Re: Re: SS ID

From: Tony McConnell <n3jly@erols.com>  
Date: Thu, 8 May 1997 14:19:06 -0400  
To: ss@tapr.org  
Message-ID: <199705081819.OAA26955@smtp3.erols.com>  
Rendered body type: text/plain

Or information on spread spectrum products we  
>could use for our packet systems. Or just stuff that is "good to know."  
>  
>Instead we have a flamfest among a small group of people on spread spectrum  
>IDing.  
>  
>Are there any mailing lists where spread spectrum radio, projects and  
>products are discussed? Or can we possibly talk about that stuff here?  
>  
>73..Jim N2VNO

Hello Jim,

the tapr website has some good links to start with, [www.sss-mag.com](http://www.sss-mag.com)  
is a very informative on-line magazine about ss. many of the chip manufacturers  
(motorola, harris, phillips, qualcom, ericson... ad nausium) have special  
ss chipsets and many have very good discussions and application notes on the  
topic that go well beyond their specific products.

i'm sorry you see some of the discussions here as a flamfest, i don't  
think the participants of these discussions see it that way. i think what would  
as a matter of definition prevent these from being called flaming is that it  
is a discussion of issues, not name calling. the reason we see so many  
different  
opinions about any of the issues involved is that we don't really agree on  
anything. that may sound stupid but the point is that we aren't starting with  
the same assumptions. what is ss? is it to use as- peer to peer lan?  
alternating  
short bursts that sound to a user as full duplex? point to point data or video  
links? saying what is ss is like saying what is fm. when we each talk about  
'SS ID' we are each thinking about a mode/use for ss at that time. but like a  
group of blind men trying to describe an elephant, we can't agree, and at times  
we are all right/wrong for a given use, because we aren't talking  
about the same thing!

But Jim we can't tolerate the use of valuable bandwidth for discussion  
on technical issues about radios and the like(hi,hi...)(well okay it may be fun  
to discuss some of it)

73 de n3jli

---

## 53. Re: [SS:1381] Re: reply comments on RM-8737

From: Dewayne Hendricks <dewayne@warpspeed.com>  
Date: Thu, 8 May 1997 11:22:59 -0700  
To: Jeff King / Kathy King <jeff@mich.com>, ss@tapr.org  
Message-ID: <v03102814af97ca451126@[204.118.182.22]>  
Rendered body type: text/plain

At 1:46 PM -0400 5/8/97, Jeff King / Kathy King wrote:  
>Your not understanding my question. I'm \*NOT\* asking or expecting  
>TAPR to provide me those comments, I'm asking how 'Joe Q. Citizen'  
>can get ahold of them so he/she can make some intelligent reply  
>comments. At this point I'm trying to save the expense/runaround of  
>calling the FCC in Washington on the phone to ask this same  
>question.... and I suspect you know the answer.

You will find the answer to your question at:

<<http://www.fcc.gov/getinfo.html>>

-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>
Fax: (510) 770-9854 !
~~~~~

## 54. SS STA Renewed

From: Dewayne Hendricks <dewayne@warpspeed.com>  
Date: Thu, 8 May 1997 12:29:53 -0700  
To: ss-sta@tapr.org, ss@tapr.org  
Message-ID: <v03102815af97d97aa472@[204.118.182.22]>  
Rendered body type: text/plain

I have just been informed by TAPR's law firm in DC that our SS STA renewal request was just granted today by the FCC. The renewal period is for another six months.

-- Dewayne  
Chair  
TAPR Regulatory Affairs Committee

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>
Fax: (510) 770-9854 !
~~~~~

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## 55. Re: [SS:1385] Re: reply comments on WT 97-12

From: Jeff King / Kathy King <jeff@mich.com>  
Date: Thu, 08 May 1997 16:00:17 -0400  
To: ss@tapr.org  
Message-ID: <2.2.32.19970508200017.0074cd38@mail.mich.com>  
Rendered body type: text/plain

At 01:32 PM 5/8/97 -0500, Dewayne Hendricks wrote:  
>  
> You will find the answer to your question at:  
>  
> <<http://www.fcc.gov/getinfo.html>>  
>  
>--- Dewayne

Yeap. As I originally feared:

<http://www.fcc.gov/getinfo.html> said: (from WT 97-12)

>Comments and reply comments will be  
>available for public inspection during regular business  
>hours in the FCC Reference Center of the  
>Federal Communications Commission (Room 239), 1919 M Street,  
>N. W., Washington, DC 20554.

Anybody on the list going to be in Washington D.C.? I'd be willing to scan all the ones in TAPR doesn't already have and post them if someone could copy them and mail them to me.

Jeff King  
P.O. Box 510895  
Livonia, MI 48151

-Jeff

---

## 56. Re: [SS:1387] Re: reply comments on WT 97-12

From: Dewayne Hendricks <dewayne@warpspeed.com>  
Date: Thu, 8 May 1997 13:59:42 -0700  
To: ss@tapr.org  
Message-ID: <v03102819af97eebea507@[204.118.182.22]>  
Rendered body type: text/plain

At 3:03 PM -0500 5/8/97, Jeff King / Kathy King wrote:  
>Yeap. As I originally feared:  
>  
><http://www.fcc.gov/getinfo.html> said: (from WT 97-12)  
>  
> >Comments and reply comments will be  
> >available for public inspection during regular business  
> >hours in the FCC Reference Center of the  
> >Federal Communications Commission (Room 239), 1919 M Street,  
> >N. W., Washington, DC 20554.  
>  
>Anybody on the list going to be in Washington D.C.? I'd be willing  
>to scan all the ones in TAPR doesn't already have and post them if

>someone could copy them and mail them to me.

You seem to have missed this part:

>>>>

## II. How to Follow a Particular Issue

(1) If you are searching for a document and have access to the Internet, visit the FCC web site. Look under the bureau you to which you think the document corresponds. If you cannot find the document, e-mail the FCC at [fccinfo@fcc.gov](mailto:fccinfo@fcc.gov) or call Sheryl Segal or David Kitzmiller on (202) 418-0260 for assistance.

(2) If you can come to the FCC in person, you may visit the FCC Reference Center in Room 239, 1919 M St., NW, Washington, DC. The staff in the Reference Center can help you find the information you are looking for. You may also sign up for a free one-hour training session that will teach you how to use RIPS -- a computer that displays documents related to proceedings.

(3) For a fee, International Transcription Service will research, retrieve, and duplicate FCC documents for you.

<<<<

The operative section for your case is (3). You can pay ITS to get you copies of everything that is filed on this docket.

-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>
Fax: (510) 770-9854 !
~~~~~

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## 57. Re: [SS:1366] Re: SS ID

From: Phil Karn <[karn@qualcomm.com](mailto:karn@qualcomm.com)>  
Date: Thu, 8 May 1997 16:13:29 -0700 (PDT)  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <199705082313.QAA09980@servo.qualcomm.com>  
Rendered body type: text/plain

>My observation is that very few hams in this area have the technical  
>capability (or interest) in tracking down ANY interference. There was a

This may well be true.

>There currently exists intermod interference at a number of mountain-top  
>repeater sites. The solution has been to install PL as a means to reduce

Intermod (true intermod -- not simple strong-signal blocking) requires multiple signals plus a nonlinear combining element. This makes it considerably more difficult to track down than a single in-band interferer.

>As for power line interference, the usual approach is to call the power  
>company and let them investigate.

Yeah, right. My own experience is different. If you're to have any chance at all, you have to locate it yourself and \*then\* go to the utility to have them fix it. If you're very lucky, they will. If they have to also locate the interference, forget it.

>Does anyone have first-hand knowledge of what SS interference sounds like  
>on a narrow-band RX? Would it be of such duration as to open the squelch  
>at co-located repeater sites? Perhaps not a problem if the repeater is

Depends mainly on the duty cycle. A continuous SS emission resembles wideband noise, so it would generally \*not\* open the noise-operated squelch on an FM receiver no matter how strong the signal was, though

it may cause the S meter to move. (A 56kb/s WA4DSY emission is sufficiently like a SS signal as far as a NBFM receiver goes, and this is exactly what happens if you tune to one with a typical NBFM receiver.)

On a AM or SSB receiver, a sufficiently strong SS signal would raise the audible noise floor and move the S meter.

Low duty cycle SS emissions (e.g., high speed packet transmissions) could very likely have transmission lengths that are too short to open squelches. If they were strong enough, they'd sound like very short bursts of wideband noise in a linear (AM or SSB) receiver.

>procurement on the existing narrow band owners. After all, isn't an SS ID >"just software"?

Maybe yes, maybe no. A low speed SS implementation might well be all in software, but a high speed one would probably do the low-level spreading functions in dedicated hardware. This hardware might require modifications to inject a narrowband CWID.

Phil

---

## 58. Current Topics

From: Lyle Johnson <lylej@azstarnet.com>  
Date: Thu, 08 May 1997 18:14:39 -0700  
To: jdc@dos.nortel.com  
Cc: ss@tapr.org  
Message-ID: <3.0.32.19970508175615.006ece60@pop.azstarnet.com>  
Rendered body type: text/plain

Jim,

I apologize if you think my comments are flaming. It is certainly not my intent.

In order to get SS useful in Amateur radio, apart from STA operation, we need a rules change. Some of us believe strongly that the rules need to be flexible so that there \*can\* be viable SS Amateur operation. The FCC is in a crucial part of a rulemaking process on this very topic.

We are in a just-completed comment period, and now in a 30-day-long opportunity for reply comments, on rules that will determine if there is to be a chance to develop "real" SS gear for the next decade or so.

Hence, the concentrated discussions on ID and other regulatory issues that are the present hot topics.

If we have rules which severely limit us, we'll have the same SS activity we have now - effectively none, because it is not of sufficient benefit to be worth the trouble.

Please bear with us while we discuss the regulatory environment. And feel free to start and contribute to threads about the aspects of SS that interest you. I think you'll find plenty of topics and interesting discussions!

Again, my apologies if I have offended you - it was not and is not my intent to "flame", only to constructively discuss these topics.

Thank you for reading this!

Lyle

---

## 59. Re: [SS:1377] Re: SS ID

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Thu, 8 May 1997 20:28:46 -0500  
To: ss@tapr.org  
Message-ID: <v03020910af982e056307@[192.168.1.2]>  
Rendered body type: text/plain

You can still send in comments to the original filing date. If they are late, they will probably still be entered in to the record. That should not stop you if you have comments.

Anyone can also send in reply comments to the comments filed. You don't have to have been in the original comments.

Greg



>  
>>Which means everyone on this list that feels this way, REALLY MUST comment  
>>on this in the reply comments to Docket 97-12. This is our ONLY chance now  
>>to get these changed. If the FCC doesn't hear from those that can express  
>>these thoughts and the comments filed are equally balanced, then we will  
>>end up with rules that will seriously limit experimentation and later  
>>implementation of SS within Part 97.  
>  
>>Be sure to read over the comments filed and if you see something in those  
>>comments that you don't like. File something in the reply comments that  
>>just covers that point. Like maybe the issue of logging and keeping the  
>>logs for over a year ? or maybe the comments about limiting Spread  
>>Spectrum to what someone termed 'narrow band' operating limits.  
>  
>>The process at the FCC is a democratic one. Thus, the majority of filings  
>>have a voice in what finally happens.  
>  
>>Cheers - Greg  
>  
>  
> Greg,  
>  
> You bring up a good point: filing comments to the FCC. I was not able  
> to write my comments and mail them to the FCC before the deadline. Can  
> I still reply to 97-12 or do I have to wait?  
>  
> I really want to voice my opinion to the U.S. Government!  
>  
> Tony KE4ATO  
>

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
http://www.tapr.org/~wd5ivd  
-----

## 60. Re: [SS:1370] Re: SS ID

From: Phil Karn <karn@qualcomm.com>  
Date: Thu, 8 May 1997 20:35:30 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705090335.UAA10879@servo.qualcomm.com>  
Rendered body type: text/plain

>And gthey have to dwell every receiver-IF-filter-width for 10 minutes. Awe  
>are now tuning 500 Hz to 2 kHz every ten minutes, trying to cvoer several  
>MHz.

So just make the CWID continuous. As long as the power spectral  
density is comparable to the SS emission it is identifying, it won't  
bother the SS receiver and only a small fraction of the total RF power  
will be spent on the ID. So why not ID continuously, just like the IDs  
on C-band satellite uplinks?

>Folks, it just is not technically practical, no matter how good the social  
>arguments, to use a narrowband ID on an SS signal.

I disagree, at least for continuous SS emissions (e.g., digital voice  
transmissions). High speed, low duty cycle packet channels are more of  
a problem for CW IDs.

Phil

## 61. Re: [SS:1372] Re: SS ID

From: Phil Karn <karn@qualcomm.com>  
Date: Thu, 8 May 1997 21:07:04 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705090407.VAA10913@servo.qualcomm.com>  
Rendered body type: text/plain

On the topic of "what does a SS emission sound like" I can offer one  
opportunity. IS-95 CDMA digital cellular is now being deployed rather  
widely around the US on both the 800 MHz cellular bands and in the new  
1.8 GHz PCS bands. Those of you with wideband receivers built before  
the ECPA went into effect (e.g., the Icom R-7000) or an RF service  
monitor (e.g., IFR 1200) can hear it. Check with your local cellular

or PCS providers to see if CDMA is available in your area. You can also check the CDMA Development Group (CDG) web page, <http://www.cdg.org/>.

The exact frequencies are of course a matter of local carrier choice, but they will adhere to the existing North American allocations. In the regular 800 MHz cellular band, the base stations always transmit in the range 870-895 MHz. (I don't know the PCS frequencies offhand.)

Both base and mobile transmissions are 1.25 MHz wide. (The details of the baseband modulation is different for the two directions, but both are ultimately direct sequence spread at the same rate by the same PN codes). They're easiest to hear in AM mode, though SSB will work too. FM (narrow or wide) will *not* work -- the squelch will not open, as the spread signal looks like noise to the noise-activated squelch (though a strong signal may move the S-meter).

The signal sounds just like broadband white noise, 1.25 MHz wide. Sometimes I can make out some fine structure in the forward link spectrum. I attribute this to the relatively large amount of power in the pilot, which is an unmodulated carrier spread by the short PN code only. The short PN code repeats rather quickly ( $2^{15}$  chips at a 1.2288 Mc/s rate -- you figure out the interval) and the ear can actually pick up the repetition interval of this code. (The ear is a remarkably good autocorrelator.)

One characteristic of IS-95 CDMA that makes it easy to identify is its very sharp bandpass filtering, to keep the signal from bleeding over into adjacent narrowband AMPS channels. You'll hear a very rapid change in signal level as you tune past either edge of the emission.

The specified bandpass filter (implemented as a digital FIR) has a fair amount of in-band ripple. Rapid rolloff and in-band flatness are tradeoffs in filter design, and here rapid rolloff was considered more important. The resulting display on a spectrum analyzer closely resembles the top of Bart Simpson's head. (The in-house slang term at Qualcomm for a composite IS-95 signal is a "bart's head").

The base stations are *far* easier to hear than the mobiles. Although it's possible to also hear the mobile stations transmitting in the 825-850 MHz range, they are transmitting at *much* lower power, with tinier antennas at lower altitudes -- and only when calls are actually up. The only way you're likely to hear one is if you are right next to a CDMA phone that's in a call.

CDMA base stations transmit continuously to provide a "pilot reference" for the mobile stations to acquire and track. The base stations must also transmit a continuous paging channel, just like AMPS.

In some implementations of IS-95 you may be able to detect a very weak residual carrier at the very center of the emission due to an imperfectly balanced mixer in the PN spreader. This carrier is useful as an accurate frequency reference (assuming you can figure out its nominal frequency) as all timing in a CDMA base station, including carrier oscillators, is referenced to a GPS receiver with a local Rb oscillator.

Phil

---

## 62. Re: [SS:1374] Linear translator and DSSS

From: Phil Karn <karn@qualcomm.com>  
Date: Thu, 8 May 1997 21:23:28 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705090423.VAA10949@servo.qualcomm.com>  
Rendered body type: text/plain

>Can multiple independent (different PN sequences) DSSS signals pass through  
>a linear translator (i.e. a analog satellite) and be received properly? The  
>assumptions made are the collective energy of all the DSSS stations  
>is not driving the translator into hard limiting.

Yes. This is Spread Spectrum Multiple Access, aka Code Division Multiple Access (CDMA). For best results, all of the signals should be of roughly equal power, and the total number of simultaneous signals must not be greater than the processing gain divided by the required  $E_b/N_0$ , with both figures represented as ratios (not dB). Otherwise the mutual interference is too great for the signals to be properly decoded.

Also, the sum of many spread signals tends toward a gaussian distribution, which is notorious for having a high peak-to-average power ratio. This makes the transponder design a little more challenging than one intended for simple hard-limited FM. On the other hand, AMSAT has a lot of experience in designing high efficiency linear satellite transponders. Amateur satellites are one of the few satellite systems that still operate in a SCPC (single channel per carrier) mode with analog modulation schemes. Most commercial satellite transponders carry either a single FM or QPSK signal that saturates the transponder, or are TDM (time division multiplexed) among several such signals that each take their turn saturating the transponder, making linearity unimportant.

Phil

---

### 63. Re: Priorities

From: Steve Sampson <ssampson@claven.tinker.af.mil>  
Date: Fri, 09 May 1997 08:52:39 -0500  
To: ss@tapr.org  
Message-ID: <33732C27.167E@eds.tinker.af.mil>  
Rendered body type: text/plain

> >Does anyone have first-hand knowledge of what SS interference sounds like  
> >on a narrow-band RX?

> Depends mainly on the duty cycle. A continuous SS emission resembles  
> wideband noise, so it would generally \*not\* open the noise-operated  
> squelch on an FM receiver no matter how strong the signal was, though  
> it may cause the S meter to move.

Forget about interference problems for the moment. 80% of the group has no radio, will not have a radio by 31 December, and will not cause ANY interference.

Priority one: Design an effective SS radio  
Priority two: Make a kit or production units  
Priority three: worry about other Hams and FCC

Steve  
"Weak Signal Hams are like  
a woman who wants the left side of the bed"

---

### 64. Re: [SS:1392] Re: SS ID

From: Lyle Johnson <lylej@azstarnet.com>  
Date: Fri, 09 May 1997 07:30:38 -0700  
To: ss@tapr.org  
Message-ID: <3.0.32.19970509070716.006ec24c@pop.azstarnet.com>  
Rendered body type: text/plain

>So just make the CWID continuous.

This means that every SS emitter is now also a guaranteed continuous narrowband emitter? I understand the spectral density - it is going to, in general, be a very WEAK narrowband emission. But it also means that each SS station is now taking up two communication "channels" one SS and one narrowband. This still strikes me as being contrary to what we are trying to achieve -- spectrum sharing with minimal interference.

And I suppose it raises the question. Suppose I get an SS radio, but some local guy has a powerful narrowband emission that is causing me interference. I only have SS gear (can't afford both). Should I not require that he have an SSID that \*I\* can copy? And, wow! if he has the same spectral density for his SSID that his narrowband station emits...

Cheers,

Lyle

---

### 65. Re: [SS:1395] Re: Priorities

From: Dewayne Hendricks <dewayne@warpspeed.com>  
Date: Fri, 9 May 1997 10:03:14 -0700  
To: ss@tapr.org  
Message-ID: <v03102836af9908fa03d4@[204.118.182.22]>  
Rendered body type: text/plain

At 8:59 AM -0500 5/9/97, Steve Sampson wrote:  
>Forget about interference problems for the moment. 80% of the

>group has no radio, will not have a radio by 31 December, and will  
>not cause ANY interference.  
>  
>Priority one: Design an effective SS radio  
>Priority two: Make a kit or production units  
>Priority three: worry about other Hams and FCC

I question the order of your priorities. I can assure you that if there isn't a successful conclusion to your priority three, then you can just forget about priorities one and two.

-- Dwayne

--

~~~~~  
Dwayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dwayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>
Fax: (510) 770-9854 !
~~~~~

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## 66. Re: [SS:1396] Re: SS ID

From: Phil Karn <karn@qualcomm.com>  
Date: Fri, 9 May 1997 13:24:18 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705092024.NAA24160@servo.qualcomm.com>  
Rendered body type: text/plain

>>So just make the CWID continuous.

>This means that every SS emitter is now also a guaranteed continuous  
>narrowband emitter? I understand the spectral density - it is going to, in

No, only continuous for as long as the SS emitter would otherwise be on the air. As I already said, this doesn't work for very short SS transmissions, e.g., high speed packet.

>general, be a very WEAK narrowband emission. But it also means that each  
>SS station is now taing up two communication "channels" one SS and one  
>narrowband. This still strikes me as being contrary to what we are trying

Not really. For a reasonable processing gain, the "channel capacity" used up by the ID (assuming comparable power spectral density) is much less than that used by the SS emission as a whole. E.g., for a process gain of 20 dB (100:1) and an assumed narrowband bandwidth of 3 Khz for both the CWID and the unspread emission, even a continuous CWID would represent 1% of the composite output power. Less, actually, since the CWID spends much of its time with the key up.

>And I suppose it raises the question. Suppose I get an SS radio, but some  
>local guy has a powerful narrowband emission thast is causing me  
>interference. I only have SS gear (can't afford both). Should I not

If you're smart, you will have designed your SS gear to use frequency hopping with burst error correction -- in which case a single narrowband jammer won't bother you (unless he's so strong as to completely blanket your radio).

Phil

---

## 67. Re: [SS:1398] Re: SS ID

From: Lyle Johnson <lylej@azstarnet.com>  
Date: Fri, 09 May 1997 16:34:45 -0700  
To: ss@tapr.org  
Message-ID: <3.0.32.19970509163436.006f0e8c@pop.azstarnet.com>  
Rendered body type: text/plain

>Not really. For a reasonable processing gain, the "channel capacity"  
>used up by the ID (assuming comparable power spectral density) is much  
>less than that used by the SS emission as a whole. E.g., for a process  
>gain of 20 dB (100:1) and an assumed narrowband bandwidth of 3 Khz for  
>both the CWID and the unspread emission, even a continuous CWID would  
>represent 1% of the composite output power. Less, actually, since the CWID  
>spends much of its time with the key up.

HHHmmm. I wasn't clear, let me try again.

Assume I am running an SS real-time voice station. My usage pattern would

be very like another voice station. If I am in QSO with one other station, I have a roughly 50% duty cycle. Maybe less than 50%, but significant, and transmitting in bursts of several seconds to several tens of seconds.

A nearby ham wants to set up a narrowband QSO with another station. He is nearby and his antenna pattern includes a major lobe of my radiated signal pattern.

If I send an ID the whole time my SS transmitter is keyed up, then I am going to effectively deny the other station the use of the narrowband channel on which my ID is being broadcast. He will hear my signal a lot, and will be forced to QSY. Not a problem if there are other narrowband channels to occupy. Might be a problem in a crowded metro area, might not.

But, if I were operating only SS, and not occupying that channel with my ID a significant part of the time, then the other station could use the narrowband channel I am not occupying. Thus, I am tying up both a narrowband channel (with my ID) \*and\* an SS "channel" with my intended communication.

Seems wasteful, and in part what we're trying to do -- have co-resident NB and SS operation without minimal mutual interference -- is defeated by the ID requirement.

Now, let's further assume the NB station set up operation before I did. Unless I also add a narrowband receiver to my SS radio, and carefully tune around and find an apparently unused NB channel for my ID, I am going to cause interference to an already-in-progress QSO with my "continual" ID.

And if the band is crowded so that I can't find a "clear channel" to send my NB ID, then I am being forced to not use my SS radio, which I could otherwise use with a negligible amount of potential interference to the crowded NB users.

\*\*\*

I realize that on 2.4 GHz I'm going to have a hard time finding anyone to interfere with, anyway, except Part 15 users (whom I am allowed to interfere with and who aren't allowed to complain). But if we get access to 2 meters, and we're already allowed operation on 70cm which is already "crowded" in some parts of the country (at least, lots of spectrum is warehoused so no one else can warehouse it), the narrowband ID rule is going to cause more trouble than it is going to cure IMHO.

Cheers,

Lyle

---

## 68. Re: [SS:1399] Re: SS ID

From: Phil Karn <karn@qualcomm.com>  
Date: Fri, 9 May 1997 19:47:17 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705100247.TAA25237@servo.qualcomm.com>  
Rendered body type: text/plain

>If I send an ID the whole time my SS transmitter is keyed up, then I am  
>going to effectively deny the other station the use of the narrowband  
>channel on which my ID is being broadcast. He will hear my signal a lot,

No. You missed the critical feature of the narrowband ID, which is that its power spectral density (measured in a typical narrowband bandwidth) is no greater than the power spectral density of my SS emission.

In other words, if my CWID interferes with some narrowband station, then so does my entire SS emission!

Phil

---

## 69. Re: Priorities

From: "Steve Sampson" <ssampson@oklahoma.net>  
Date: Fri, 9 May 1997 22:26:28 -0500  
To: <ss@tapr.org>  
Message-ID: <199705100334.WAA06903@dns.okc>  
Rendered body type: text/plain

> I question the order of your priorities. I can assure you that if  
> there isn't a successful conclusion to your priority three, then you can  
> just forget about priorities one and two.

Washington hasn't changed much (despite Vice President Gore's re-invent Government plans). I will bet you a Coke that the rules will have band segments and narrow band morse code ID.

If you really want to scare the heck out of the Wireless industry, explain to them our intent to do Morse code all over the 900 MHz band at high power. You then have instantly more votes than the ARRL PAC, and a greater chance of success.

But at any rate, several ideas have been proposed on generating narrow band Morse code ID's. It's not a technical problem. If the rules come out (and I lose the Coke) you can do like the TNC-2 did; command it on or off. Get over it.

Steve

---

## 70. Re: [SS:1400] Re: SS ID

From: Tony McConnell <n3jly@erols.com>  
Date: Sat, 10 May 1997 01:50:10 -0400  
To: ss@tapr.org  
Message-ID: <199705100550.BAA24594@smtp3.erols.com>  
Rendered body type: text/plain

At 09:50 PM 5/9/97 -0500, you wrote:  
>>If I send an ID the whole time my SS transmitter is keyed up, then I am  
>>going to effectively deny the other station the use of the narrowband  
>>channel on which my ID is being broadcast. He will hear my signal a lot,  
>  
>No. You missed the critical feature of the narrowband ID, which is that  
>its power spectral density (measured in a typical narrowband bandwidth)  
>is no greater than the power spectral density of my SS emission.  
>  
>In other words, if my CWID interferes with some narrowband station, then  
>so does my entire SS emission!  
>  
>Phil  
notice what Phil says there, it is important.

picture if you will a 3dB attenuator that can be keyed on and off in your ss transmitter. key that attenuator with your morse id. a narrow band receiver that can hear part of the transmission can hear that change in amplitude, if it uses a mode that is amplitude sensitive(am,ssb...). by listening to the level of the signal go up and down, by ear a skilled operator could copy an id. this is not a separate/discrete carrier apart from the ss signal, but the signal itself, by manipulating the modulation characteristics and again, if the narrow band receiver can hear the ss transmission it will hear the amplitude modulation at an audio rate of the transmission.

that is one view of a narrow id of a ss transmission that can be copied with a narrow receiver.

another is ....

you are transmitting on some band, with a spreading method that 'evenly' distributes your 1watt transmit power across lets say for the example 100KHz. to id that signal with a discrete narrow band transmission with a similar spectral density let's say you chose ssb voice(for the sake of example) that has a band width of 2KHz(300-2300Hz), it would occupy one fiftieth of the used band width, thus that narrow band id would require one fiftieth of the power of the wide transmission to satisfy a spectral density similar to the transmission that it is identifying. when viewed in this way, it is no more likely to interfere than the ss signal itself. using a narrower mode(cw) could be done with power levels that are inverse to their bandwidth in relation to the ss signal.

remember the blind committee's elephant?

the method that makes the most sense for id purposes really depends on what you are trying to do.(and what they(the fcc) will let us get away with).

73 de n3jli

---

## 71. Re: [SS:1402] Re: SS ID

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Sat, 10 May 1997 01:53:04 -0500  
To: ss@tapr.org  
Message-ID: <v03020925af99c4a75bb8@[192.168.1.2]>  
Rendered body type: text/plain

Then again how do we handle FHSS systems ? or what about a hybrid FH DS SS system ?

If we have the FHSS system hopping about 10msec ?

I guess we could vary the pattern of hopping and present some callsign pattern on the spectrum analyzer for the person to see :-) That is if they have an analyzer that sweeps fast enough.

As with a lot of amateur radio stuff I read, we are spending countless hours discussing an issue that will happen a very limited amount of time -- that of harmful interference (like less than .01%) and how are we going to track it down for people that are too lazy to probably even notice to begin with. Trust me, if I put something on the air and it interferes with a serious weak signal operator, I can expect they will take the time to figure out the issue and solve it and let me know about it.

TAPR, PacComm, or someone else is going to end up producing a unit that is the same for the majority of the user base that want to venture into the area of SS operations. Few experimenters are going to actually build something and if they do and it does interfere with someone -- that is one case in an isolated area. I highly doubt we are going to see even a hundred people build their own systems in the next 5 years from the basics. If the system built interferes, I doubt many are going to want to propagate it locally or nationally. Thus, we might end up with rules that could be hard if not impossible to implement that will be turned off after several years -- just like CW on packet radio. A system that TAPR or someone eventually tries to replicate is going to have to operate functionally correct -- not harmfully interfere with anyone.

We need to simply agree that we might be spending our time better designing systems that don't interfere to begin with then focusing on how we plan to ID these same systems that should be built to minimize this issue. As Lyle and others pointed out -- I doubt few people that get on this mode are going to secretly go off and operate. We are going to be looking for others to get on the air operate with us. That means talking it up at club meetings and other events and on the voice repeaters and else where. If anything, we will have the old case of neighbors pointing to our new antenna saying that is what is causing their RFI. I am sure you have all heard that story.

"Ham puts up a new tower and installs new beam; however, the ham leaves the coax attached to the bottom of the tower with no connector and doesn't run it inside. About a week later a group of neighbors come over and tell him about their RFI problems and obviously this new tower and antenna is causing the problem. The ham takes them out back and shows them that the coax doesn't even have a connector on it. That convinces most of them, but a few still think the antenna is probably doing it by itself :-) Anyway, the story ends with the good ham doing their best to help locate the RFI that is really causing the problem and everyone is happy in the end. After everything was said and done, these folks had RFI problems for a long time, just that the new technology in obvious view made them think about it and gave them a place to point and talk about."

Don't we already have 'interference' (not harmful) on many of our bands -- even the weak signal areas ? Heck, the two operators that can't hear themselves are causing an increase in the noise floor when they operate on the same freq. That was the most meaningful part of the Sheppard thesis -- the worry is not local signals, but the adding up of signals at a distance (stated a little to simple). We face the potential sometime in the future of being this ham in my example. Our new technology (like old stuff) is causing or will cause people to think about what is happening on their bands. I am sure people will point at us and blame all sorts of strange spectrum related activity to our new operations with new equipment.

Also, if you ain't filing at the FCC, your voice on here about how things should work have little impact on the eventual rules process. Not to be rude or anything, but we can talk all day -- what we need is simple rules that don't limit a mode of operations we want to experiment with. This is about making the rules be about amateur radio, not about protectionism. While others might believe this is going to be a threat -- there is nothing in the rules that says someone should have a section of the band to themselves to ensure no one every bothering them. If everyone that is talking about the issues, is not filing, then you are missing the point and we could be missing our only opportunity to really have an influence on doing something important.

Heck -- I just read a post that someone made that states that maybe the ATV folks need to be protected from SS operations and someone should file that

way. If we are not making our points on this issue -- no one else will be.

Greg

```
>At 09:50 PM 5/9/97 -0500, you wrote:
>>>If I send an ID the whole time my SS transmitter is keyed up, then I am
>>>going to effectively deny the other station the use of the narrowband
>>>channel on which my ID is being broadcast. He will hear my signal a lot,
>>
>>No. You missed the critical feature of the narrowband ID, which is that
>>its power spectral density (measured in a typical narrowband bandwidth)
>>is no greater than the power spectral density of my SS emission.
>>
>>In other words, if my CWID interferes with some narrowband station, then
>>so does my entire SS emission!
>>
>>Phil
>notice what Phil says there, it is important.
>
>picture if you will a 3dB attenuator that can be keyed on and off in your
>ss transmitter. key that attenuator with your morse id. a narrow band
>receiver that can hear part of the transmission can hear that change in
>amplitude, if it uses a mode that is amplitude sensitive(am,ssb...). by
>listening to the level of the signal go up and down, by ear a skilled
>operator could copy an id. this is not a separate/discrete carrier apart
>from the ss signal, but the signal itself, by manipulating the modulation
>characteristics and again, if the narrow band receiver can hear the ss
>transmission it will hear the amplitude modulation at an audio rate of
>the transmission.
>
>that is one view of a narrow id of a ss transmission that can be copied
>with a narrow receiver.
>
>another is ....
>
>you are transmitting on some band, with a spreading method that 'evenly'
>distributes your 1watt transmit power across lets say for the example
>100KHz. to id that signal with a discrete narrow band transmission with
>a similar spectral density let's say you chose ssb voice(for the sake of
>example) that has a band width of 2KHz(300-2300Hz), it would occupy one
>fiftieth of the used band width, thus that narrow band id would require
>one fiftieth of the power of the wide transmission to satisfy a spectral
>density similar to the transmission that it is identifying. when viewed
>in this way, it is no more likely to interfere than the ss signal itself.
>using a narrower mode(cw) could be done with power levels that are
>inverse to their bandwidth in relation to the ss signal.
>
>remember the blind committee's elephant?
>
>the method that makes the most sense for id purposes really depends
>on what you are trying to do.(and what they(the fcc) will let us get
>away with).
>
>73 de n3jli
```

```
-----
Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----
```

---

## 72. RE:SS ID

```
From: "Andrew Cornwall" <cornwaab@ednet.ns.ca>
Date: Sat, 10 May 1997 17:04:55 +0000
To: ss@tapr.org
Message-ID: <9705101809.AA28262@trademart-1.ednet.ns.ca>
Rendered body type: text/plain
```

Hello,

I have been following SS-DD thread for only a couple of weeks, so my comments below may have already been covered.

A requirement for an ID to accompany SS transmissions seems to me to be necessary for its acceptance and use by radio amateurs. I cannot imagine undertaking SS amateur radio



without an ID, but to me the ID is more than just a call sign.

The ID would be transmitted in SS over specific frequencies (or control channels) within a band. This is analogous to a calling frequency, and serves somewhat the same purpose. Whether a band has one or more control channels would be determined by experience, perhaps during the STA period. The command channel PNcode, frequency spread, and other parameters would be standardized. At a minimum, all SS transceivers would be equipped to work with the standard structure, on the command channel.

In addition to fulfilling an expanded ID function, the standard structure would assure that all SS transceivers can communicate with each other in an emergency, at least over the control channel.

An amateur radio transmitter would automatically post information to the command channel at the start of each transmission session, and every few minutes thereafter. More frequent postings may be at the option of the operator. Note that the control channel is not meant to be a primary communications conveyor; instead it announces that communications are occurring elsewhere in the band.

The kind of information posted to the calling channel would be the following:

- sending station call sign (ID)
- contacted station call signs (none if initiating a contact)
- frequency where the station's SS communications transmission is occurring, and characteristics of SS communications such as PNcode and other spread parameters, packet structure, data or audio content, data compression type, audio sampling rate and word, etc. (so other amateurs can tune in and monitor the traffic)
- Other information:
  - . CQ' or destination station call sign when initiating contact(s)
  - . request for repeater availability
  - . broadcast announcement that a station is available as a repeater
  - . routing to distant stations
  - . emergency communications content
  - . etc.

In operation, I can imagine a radio amateur monitoring the control channel for SS activity in the band. On his computer screen would be a list of SS transmitters and the SS characteristics of each transmission. Maybe there is a CQ request at frequency X' using Y' SS characteristics, that is of interest. The radio amateur then highlights the contact information on the screen and clicks-twice, where upon the computer configures the shack's transceiver and peripherals to listen-in and establish contact if desired.

The use of the control channel would be mandatory and enforced by government regulation, further the frequency space(s) would be protected by regulation for this purpose.

--- Andy / VE1COR  
cornwaab@ednet.ns.ca

---

### 73. Re: [SS:1404] RE:SS ID

From: RLANIER@mailb.harris.com (RLANIER)  
Date: Mon, 12 May 1997 12:15:12 -0400  
To: ss@tapr.org  
Message-ID: <37741ea0@mailb.harris.com>  
Rendered body type: text/plain

>The use of the control channel would be mandatory and  
>enforced by government regulation, further the frequency  
>space(s) would be protected by regulation for this

>purpose.

>--- Andy / VE1COR  
>cornwaab@ednet.ns.ca

If this doesn't have shades of Big Brother, I don't know what does.

This SS ID issue is becoming INSANE!!! Why don't we follow the rules:  
ID every 10 minutes and use the minimum power necessary to  
communicate?

The ID'ing would occur in the modulation format used for transmission.  
Wouldn't it be asinine to suggest that FM users ID using SSB because  
someone doesn't have FM equipment?

Why does this have to be so complicated guys?

Tony

---

## 74. RE: 1405] RE:SS ID

From: "Hunter, Bob" <Bob\_Hunter@ATK.COM>  
Date: Mon, 12 May 1997 12:34:24 -0500  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <c=US%a= %p=ATK%l=EXCHANGE\_MN2-970512173424Z-1518@exchange\_mn2.atk.com>  
Rendered body type: text/plain

Hear hear!

>-----

>From: RLANIER@mailb.harris.com[SMTP:RLANIER@mailb.harris.com]  
>Sent: Monday, May 12, 1997 11:16 AM  
>To: ss@tapr.org  
>Subject: [SS:1405] RE:SS ID

>

>>The use of the control channel would be mandatory and  
>>enforced by government regulation, further the frequency  
>>space(s) would be protected by regulation for this  
>>purpose.

>>--- Andy / VE1COR  
>>cornwaab@ednet.ns.ca

> If this doesn't have shades of Big Brother, I don't know what does.

> This SS ID issue is becoming INSANE!!! Why don't we follow the rules:  
> ID every 10 minutes and use the minimum power necessary to  
> communicate?

> The ID'ing would occur in the modulation format used for transmission.  
> Wouldn't it be asinine to suggest that FM users ID using SSB because  
> someone doesn't have FM equipment?

> Why does this have to be so complicated guys?

> Tony

>

>

---

## 75. Introducing Cylink DataMetro, first wireless remote access router that scales wireless WANs beyond metropolitan areas

From: Dewayne Hendricks <dewayne@warpspeed.com>  
Date: Tue, 13 May 1997 01:38:49 -0700  
To: ss@tapr.org  
Message-ID: <v03102829af9dd6f85b08@[204.118.182.22]>  
Rendered body type: text/plain

Note:

I thought that I would post this Cylink press release to the list as I felt it represents a significant new product in the Part 15 unlicensed spread spectrum market and that some of you might be interested in hearing about this development.

First, take note of the price, which is a LOT higher than I would like to see it for a product with this capability. Second, note that the user is asked to supply a PC to run the Cylink router code. This is a fairly unique twist that I haven't seen from other companies in this market before.

There is no other info on this product available at this time as Cylink hasn't updated their website yet.

-- Dewayne

=====

Introducing Cylink DataMetro, first wireless remote access router that scales wireless WANs beyond metropolitan areas; Cylink DataMetro interconnects LANs at data rates approaching T1

Source: Business Wire

SUNNYVALE, Calif.--(BUSINESS WIRE) via Individual Inc. -- Cylink Corporation, a leading provider of wireless communications products, today announced Cylink DataMetro, the first wireless remote access router that connects geographically dispersed networks at up to and beyond metropolitan distances.

Cylink DataMetro offers superior price/performance compared to wired and wireless alternatives and supports a diverse range of internetworking applications -- from interbuilding connectivity to specialized industrial wide area networks.

Where a wired infrastructure is absent or costly, Cylink DataMetro connects geographically scattered LANs by creating a wireless WAN over which it routes network traffic. With Cylink DataMetro, organizations that operate with dispersed sites, and network service providers with dispersed customers, get needed network connectivity, up to metropolitan distances and beyond (i.e. 30 miles or more).

Unlike wireless bridges which simply connect LAN segments into a single logical network, Cylink DataMetro functions at the network layer with IP/IPX routing, permitting the network designer to build large, high performance, manageable networks.

"We're excited to leverage our spread spectrum technology into a complete solution for wireless internetworking," said Steve Goldberg, general manager, Cylink Wireless Communications Group. "Many of our customers use our spread spectrum digital microwave radios for network connectivity today. Cylink DataMetro offers a new architecture that will drive the interconnection of region-wide computer networks."

Cylink DataMetro supports three topologies -- star, mesh, and point-to-point -- which are implemented with efficient MAC protocols and can be combined in an internetwork. A polled protocol (star topology) provides efficient shared access to the channel even under heavy loading.

For small scale networks, a CSMA/CA protocol supports a mesh topology. Clusters of nodes can be connected using a point-to-point protocol when building large scale internetworks. The single-hop node-to-node range is up to 30 miles depending on terrain, antennas, etc., with a multiple hop range extending on the order of a hundred miles.

End-to-end SNMP supports management of the radios and the wireless WAN along with the remainder of the enterprise network using industry standard SNMP tools. The result is a manageable network with reach extending to metropolitan, suburban, rural, remote, and isolated areas.

Applications of Cylink DataMetro include remote site LAN connectivity and network service dissemination. Organizations with remote offices such as banks, health care networks, government agencies, schools and other service organizations can connect their computing resources. Industrial and manufacturing companies can reliably and cost effectively connect factories, warehouses, and research facilities. Network service providers can distribute Internet, VSAT, and other network services to their customers.

"We've seen a need for wireless remote network access solutions for a long time, and Cylink's DataMetro addresses that need handily," said Tom Esperson, director of Mobile Computing and Communications for the Yankee Group of Boston. "DataMetro is a robust and credible alternative to wireless bridges and other wireless remote access technologies. It offer users some unique advantages such as the ability to configure the

architecture to support a variety of networking topologies."

A WAN built with Cylink DataMetro exploits the tariff-free wireless "infrastructure." A wireless WAN offers a substitute for a wired infrastructure with its associated costly service fees. In areas where a wired infrastructure is absent or underdeveloped, Cylink DataMetro newly enables internetworking. Performance is comparable to commonly used wired WAN connections, approaching T1 speeds with its 1.3 Mbps data rate.

The product is rooted in Cylink's industry-leading direct sequence spread spectrum RF platform. Cylink radios are field proven in tens of thousands of installations in the harshest environments and over the most challenging terrain around the world. Cylink's experience as a pioneer in spread spectrum technology brings the most robust performance possible.

A user-supplied PC hosts the product through a connection to the PC's parallel printer port. Software includes an installation utility, network drivers, management, and IP/IPX routing. No radio license is required in the U.S. and many other countries, simplifying the network development process compared to licensed microwave.

#### Pricing and availability

List price for Cylink DataMetro 1280 (1.28 Mbps) is \$3995, and Cylink DataMetro 320 (320 kbps) is \$2995. Both models will be available in May, 1997.

#### About Cylink

Cylink's Wireless Communications Group is a world leader in fixed outdoor wireless networking infrastructure for voice and data. Additional products include managed and unmanaged digital microwave radio modems which support full-duplex communication at rates of 19.2 kbps to 2.048 Mbps.

Cylink (NASDAQ:CYLK), headquartered in Sunnyvale, California, is also a world leader in information security products. Cylink's customers include national and multinational corporations, financial institutions and government organizations. For more information about Cylink and its products, visit the company's web site at [www.cylink.com](http://www.cylink.com) or call the fax-on-demand number 800-735-6614.

CONTACT: Edelman Public Relations | Jillian Bargas, 415/968-4033 | [JILLIAN\\_BARGAS@EDELMAN.COM](mailto:JILLIAN_BARGAS@EDELMAN.COM)

[05-12-97 at 08:00 EDT, Business Wire]

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~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>
Fax: (510) 770-9854 !
~~~~~

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## 76. To IP stack or to not IP Stack ?

From: "Greg Jones, WD5IVD" <[wd5ivd@tapr.org](mailto:wd5ivd@tapr.org)>  
Date: Tue, 13 May 1997 04:25:31 -0500  
To: " Spread Spectrum " <[ss@tapr.org](mailto:ss@tapr.org)>  
Message-ID: <[v03020903af9de377d847@192.168.1.2](mailto:v03020903af9de377d847@192.168.1.2)>  
Rendered body type: text/plain

There has been some informal discussion recently that centered on the issue of putting an IP stack inside a SS radio ?

It would be easy enough to add some additional processor horsepower into the controller, since the controller is already supporting an Ethernet interface and handling the others tasks related to the SS radio.

Does one implement an IP stack or do something else to handle the communications between radios ?

Cheers - Greg

-----

Greg Jones, WD5IVD

Austin, Texas  
wd5ivd@tapr.org  
http://www.tapr.org/~wd5ivd  
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---

## 77. UNSUBSCRIBE

From: TJ OBRIEN <0007367829@mcimail.com>  
Date: Tue, 13 May 1997 07:50:38 -0500 (EST)  
To: tapr <ss@tapr.org>  
Message-ID: <97051312503821/0007367829PJ2EM@mcimail.com>  
Rendered body type: text/plain

[Empty message body]

---

## 78. Re: [SS:1356] Re: SS Questions for Rule Filing

From: RLANIER@mailb.harris.com (RLANIER)  
Date: Tue, 13 May 1997 11:04:09 -0400  
To: ss@tapr.org  
Message-ID: <37883010@mailb.harris.com>  
Rendered body type: text/plain

>>I'd also like to know if someone knows of a study comparing the output  
>>spectrum of a narrowband transmitter to a SS transmitter, both operating at  
>>, say 50 watts? In other words, would a SS system transmitting at 100 watts  
>>overpower a narrowband system transmitting at 10 watts, under ideal  
>>conditions? Is there a linear relationship to this?

>The key figure is "power spectral density", which is simply the total  
>transmitter power divided by the bandwidth.

>If you have a 100W transmitter spreading over 1 MHz, the power  
>spectral density is  $100/1e6 = .0001$  W/Hz. If you have a 10 W  
>narrowband transmitter operating in 3 KHz, then the power spectral  
>density is  $.0033$  W/Hz, which is 33.3 times or 15.2 dB stronger. So  
>if  
>everything else is the same (path loss, etc), the narrowband signal will  
>still be 15.2 dB stronger than the wideband signal in the narrowband  
>receiver even though the total transmitter power for the wideband signal  
>is 10 dB greater.

>Phil

Are these calculations taking into consideration the distance between  
the two transceivers? Obviously, the distance is proportional to the  
amount of interference. How can I accurately determine the dB strength  
of a signal based upon its distance from my transceiver, using the  
above calculations as a reference?

I'd also like to know the average output power EME users use. I have  
be told that some use up to the maximum power level allowed, which is  
1500 watts. If this is true, then why isn't there some type of special  
rule governing EME? After all, 1500 watts will over power ANY weak  
signal and satellite operator or FM or AM or SSB or repeater or ...

Tony KE4ATO

---

## 79. Re: [SS:1410] Re: SS Questions for Rule Filing

From: Dirk Koopman <djk@tobit.co.uk>  
Date: Tue, 13 May 1997 16:49:07 +0100 (BST)  
To: ss@tapr.org  
Message-ID: <Pine.LNX.3.95.970513164437.29420C-100000@dirku.tobit.co.uk>  
Rendered body type: text/plain

On Tue, 13 May 1997, RLANIER wrote:

>  
> Are these calculations taking into consideration the distance between  
> the two transceivers? Obviously, the distance is proportional to the  
> amount of interference. How can I accurately determine the dB strength  
> of a signal based upon its distance from my transceiver, using the  
> above calculations as a reference?  
>

Db is a ratio, no of Db doesn't change just the actual level of volts.

>  
> I'd also like to know the average output power EME users use. I have  
> be told that some use up to the maximum power level allowed, which is  
> 1500 watts. If this is true, then why isn't there some type of special  
> rule governing EME? After all, 1500 watts will over power ANY weak  
> signal and satellite operator or FM or AM or SSB or repeater or ...  
>

the 'point' is they are 'pointing' upwards, usually using very high gain antennas, this inherently means that there is comparatively little energy escaping sideways, down or anywhere else but where the moon happens to be.

If you are between the beam and the moon (happens sometimes when the moon is low down on the horizon) or else just too close to 1.5Kw you will know about it.

--

Dirk-Jan Koopman            Tel/Fax: +44 1362 696076 Mobile: +44 973 333806  
Computer Consultant        Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU  
"The typewriting machine, when played with expression, is no more annoying than the piano when played by a sister or near relation." --Oscar Wilde

## 80. Re: [SS:1410] Re: SS Questions for Rule Filing

From: Jerry Normandin <jerryn@ici.net>  
Date: Tue, 13 May 1997 20:59:58 -0400  
To: ss@tapr.org  
Message-ID: <33790E8E.3EA869D7@ici.net>  
Rendered body type: text/plain

Jerry Normandin Replies:

Man... at the frequencies used now... 902 and 2.4Ghz Spread Spectrum radios your pretty much limited by the curvature of the earth. It does not matter what your power output is. Your signal is still going to hit the ground. If your at 902Mhz and your antenna is 100feet up and there are no trees in the way your only going to have a 26 mile range. I use a helium blimp on a tether to bounce my signal when I am experimenting. I can get 50 miles on 1 Watt like this. I use a dish antenna of course but I can do it. Also Spread Spectrum's benefits easily outweigh the power spectral density issue!

BTW, the blimp's gondola lifts a cheap 386 laptop running Linux and of course a PCMCIA WaveLAN card. Power is provided by NiCADs.

What the heck.... it works! Highest altitude on the blimp has been 500ft. You can do a lot with one watt!

RLANIER wrote:

>  
> >>I'd also like to know if someone knows of a study comparing the output  
> >>spectrum of a narrowband transmitter to a SS transmitter, both operating at  
> >>, say 50 watts? In other words, would a SS system transmitting at 100 watts  
> >>overpower a narrowband system transmitting at 10 watts, under ideal  
> >>conditions? Is there a linear relationship to this?  
>  
> >The key figure is "power spectral density", which is simply the total  
> >transmitter power divided by the bandwidth.  
>  
> >If you have a 100W transmitter spreading over 1 MHz, the power  
> >spectral density is  $100/1e6 = .0001$  W/Hz. If you have a 10 W  
> >narrowband transmitter operating in 3 KHz, then the power spectral  
> >density is  $.0033$  W/Hz, which is 33.3 times or 15.2 dB stronger. So  
> >if  
> >everything else is the same (path loss, etc), the narrowband signal will  
> >still be 15.2 dB stronger than the wideband signal in the narrowband  
> >receiver even though the total transmitter power for the wideband signal  
> >is 10 dB greater.  
>  
> >Phil  
>  
>  
> Are these calculations taking into consideration the distance between  
> the two transceivers? Obviously, the distance is proportional to the  
> amount of interference. How can I accurately determine the dB strength  
> of a signal based upon its distance from my transceiver, using the  
> above calculations as a reference?

>  
>  
> I'd also like to know the average output power EME users use. I have  
> be told that some use up to the maximum power level allowed, which is  
> 1500 watts. If this is true, then why isn't there some type of special  
> rule governing EME? After all, 1500 watts will over power ANY weak  
> signal and satellite operator or FM or AM or SSB or repeater or ...  
>  
>  
> Tony KE4AT0

---

## 81. Re: [SS:1407] Introducing Cylink DataMetro, first wireless remote access router

From: Phil Karn <karn@qualcomm.com>  
Date: Tue, 13 May 1997 20:04:48 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705140304.UAA23271@servo.qualcomm.com>  
Rendered body type: text/plain  
  
What's the big deal? Looks like what you already get when you take an  
IP router (any router) and add a few radios...

Phil

---

## 82. Re: [SS:1408] To IP stack or to not IP Stack ?

From: Phil Karn <karn@qualcomm.com>  
Date: Tue, 13 May 1997 20:05:25 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705140305.UAA23274@servo.qualcomm.com>  
Rendered body type: text/plain  
  
>There has been some informal discussion recently that centered on the issue  
>of putting an IP stack inside a SS radio ?

I don't see the point. Leave the IP stack inside the computers and routers,  
and let the radios do all the lower level stuff.

Phil

---

## 83. Re: [SS:1410] Re: SS Questions for Rule Filing

From: Phil Karn <karn@qualcomm.com>  
Date: Tue, 13 May 1997 20:15:34 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705140315.UAA23284@servo.qualcomm.com>  
Rendered body type: text/plain  
  
Are these calculations taking into consideration the distance between  
the two transceivers? Obviously, the distance is proportional to the  
amount of interference. How can I accurately determine the dB strength  
of a signal based upon its distance from my transceiver, using the  
above calculations as a reference?

The example I gave explicitly stated that the path losses were the same.  
Obviously if the SS transmitter is much closer to the receiver than  
the intended narrowband transmitter, then the interference contributed  
by the SS transmitter will be much greater.

I'd also like to know the average output power EME users use. I have  
be told that some use up to the maximum power level allowed, which is  
1500 watts. If this is true, then why isn't there some type of special  
rule governing EME? After all, 1500 watts will over power ANY weak  
signal and satellite operator or FM or AM or SSB or repeater or ...

On the lower bands I believe that the full legal limit is common. On  
the higher bands (23cm and up) I think some operators are limited by  
how much RF amplification they can afford. Also, the antenna gains increase  
to where EME with less than legal limit power can work, at least  
some of the time. I'm not an EMEer, so I can't speak authoritatively.

Phil

---

## 84. Re: [SS:1414] Re: To IP stack or to not IP Stack ?

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Tue, 13 May 1997 22:53:18 -0500  
To: ss@tapr.org  
Message-ID: <v03020914af9ee670a97d@[192.168.1.2]>  
Rendered body type: text/plain

But why spend an extra \$1000+ for the computer to allow you to connect to someone else Phil when we have a \$100 (Motorola has an embeded powerpc chip with Ethernet controller integraetd available in low qty numbers for around \$70-\$80) processor available on the radio that could easily support it ? Then again we are going to have amateurs that will want to try to do this on a XT or 286 machine, or don't have the cash for 16Megs of memory to do what is necessary.

Just put Ethernet into it and it does it ? The Ascend box or other ISDN boxes have IP stacks in them ? What is different between them and our application ? Other than the interface between the units.

Is just pushing bits between point A and point B enough for the network topology that needs to be supported in different parts of the US ?

Do we use IP across the radio links or do we do some type of MAC layer interface is another question for discussion.

Cheers - Greg

```
>>There has been some informal discussion recently that centered on the issue
>>of putting an IP stack inside a SS radio ?
>
>I don't see the point. Leave the IP stack inside the computers and routers,
>and let the radios do all the lower level stuff.
>
>Phil
```

```
-----
Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----
```

---

## 85. Re: [SS:1413] Re: Introducing Cylink DataMetro, first wireless remote access router

```
From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Tue, 13 May 1997 22:32:13 -0700
To: ss@tapr.org
Message-ID: <v03102810af9efe73316d@[204.118.182.22]>
Rendered body type: text/plain
```

At 10:08 PM -0500 5/13/97, Phil Karn wrote:  
>What's the big deal? Looks like what you already get when you take an  
>IP router (any router) and add a few radios...

Its a big deal for companies in the Part 15 market. They've just discovered routers. Bridges were as far as they've gotten for the past several years.

-- Dewayne

--

```
~~~~~
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>
Fax: (510) 770-9854 !
~~~~~
```

---

## 86. Re: [SS:1416] Re: To IP stack or to not IP Stack ?

```
From: Phil Karn <karn@qualcomm.com>
Date: Tue, 13 May 1997 22:40:04 -0700 (PDT)
To: ss@tapr.org
Message-ID: <199705140540.WAA23750@servo.qualcomm.com>
Rendered body type: text/plain
```

Oh god, here we go again on the never-dying theme of "do we make our own special purpose single-board computers or do we use generic PCs?"

If you have a need for IP services from your packet radio modem, chances are you have a computer speaking TCP/IP somewhere near it already. So there is no "extra \$1000+" for the computer.

Phil



## 87. Re: [SS:1418] Re: To IP stack or to not IP Stack ?

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Wed, 14 May 1997 01:30:25 -0500  
To: ss@tapr.org  
Message-ID: <v03020917af9f0964e23e@[192.168.1.2]>  
Rendered body type: text/plain

Yes -- here it does come again. But let's try to get closure on it this time -- instead of just looking around the sides of the issue. I really want to try to understand your standing on this and maybe it will change the way I see things being implemented.

Let me start with one question then.

Can we agree that the radio and computer communicate via an Ethernet link. I think we can, but I want to make sure we are going in the same direction here.

(PLEASE no debate on serial connections on this thread!! from others).

If we have an Ethernet interface on the radio -- what is the best method to get bits between it and the computer ?

How does the radio and computer communicate if attached directly or if the radio is setting on a Ethernet network ?

Or is it your belief that we will place a dedicated Ethernet card on one computer and that computer acts as the router/bridge to the rest of the network via a second ethernet card ?

Let me repeat the question in the first message. How do the radios talk ? IP ? MAC layer ? How do we push bits between radios addressed in such a way they no where they are going.

Phil, what do you think the solution to these issues are ?

Greg

>Oh god, here we go again on the never-dying theme of "do we make our  
>own special purpose single-board computers or do we use generic PCs?"  
>  
>If you have a need for IP services from your packet radio modem, chances  
>are you have a computer speaking TCP/IP somewhere near it already. So  
>there is no "extra \$1000+" for the computer.  
>  
>Phil

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>  
-----

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## 88. Re: [SS:1419] Re: To IP stack or to not IP Stack ?

From: Jeff King / Kathy King <jjeff@mich.com>  
Date: Wed, 14 May 1997 04:09:22 -0400  
To: ss@tapr.org  
Message-ID: <2.2.32.19970514080922.00bc7bbc@mail.mich.com>  
Rendered body type: text/plain

At 01:31 AM 5/14/97 -0500, Greg Jones, WD5IVD wrote:

>Let me start with one question then.  
>  
>Can we agree that the radio and computer communicate via an Ethernet link.  
>I think we can, but I want to make sure we are going in the same direction  
>here.  
>(PLEASE no debate on serial connections on this thread!! from others).  
>

Why not ISA or PCI? It certainly can (would) be more cost effective than a stand alone ether net box, and frankly, would more closely fit the "ham" cost model (I think) we are striving for. Its also a model most of the Part 15 manufacturers have already addressed. History is a good teacher.... look at the TAPR NCP and the Gracillis box...and then compare there deployment versus open standards such as KA9Q nos based on the ISA/PC standard.

I'd focus on the MAC layer and forgo any direct implementations of a IP layer. Another advantage of a ISA/PCI based solution is you don't need a case.... a cost savings not be ignored.

>But why spend an extra \$1000+ for the computer to allow you to connect to  
>someone else Phil when we have a \$100 (Motorola has an embeded powerpc  
>chip with Ethernet controller integraetd available in low qty numbers for  
>around \$70-\$80) processor available on the radio that could easily support  
>it ? Then again we are going to have amateurs that will want to try to do  
>this on a XT or 286 machine, or don't have the cash for 16Megs of memory to  
>do what is necessary.

Do we support the ham with a C-64 also? I just bought 16 megs of memory for \$79. I bought a 133mhz 486 MB with PCI/VLB for \$99. I think it is counterproductive to try and support the 'XT or 286' equipped amateur when reasonably fast hardware is available for next to nothing. Heck, most XT's/286's would be hard pressed to keep up with T1 rates anyways.

I'm not suggest the 'best' environment, but I am suggesting the model that will work the best in the amateur radio based environment. Design some sort of PCI and/or ISA based radio card.... possibly with the radio head remote able, and make it a open standard for both WIN95 and Linux with regards to development tools. Possibly look at the AMD MAC layer chips for the interface between the SS chips and the ISA/PCMCIA bus. Do not underestimate the cost of developing any embedded controller system..... they only make sense when you have very high volumes and a good marketing team, neither of which is likely.

I take it the renewed interest is because TAPR got the NSA grant? I don't think the marketplace should be ignored. Almost all dedicated ham radio routers have not been commercial successes. Learn from this and make a building block that someone can either use at home PC or incorporate into a PC/WIN95/UNIX system to make a router. Most hams are only interested in what technology can do for them, not what they can do for the community. You may not like hearing that, but it is reality. Hence, most of your sales will be to the end users NOT the eccentric node operators. Not withstanding, a open expandable product could fulfill both needs.

Regards,

```
-----
| Jeff King      Aero Data Systems |
| jeff@mich.com  P.O. Box 510895   |
| (810)471-1787  Livonia, MI 48151  |
| F(810)471-0279 United States     |
|-----
```

---

## 89. Re: [SS:1418] Re: To IP stack or to not IP Stack ?

From: Dewayne Hendricks <dewayne@warpspeed.com>  
Date: Wed, 14 May 1997 01:14:11 -0700  
To: ss@tapr.org  
Message-ID: <v03102812af9f24531979@[204.118.182.22]>  
Rendered body type: text/plain

At 12:47 AM -0500 5/14/97, Phil Karn wrote:  
>Oh god, here we go again on the never-dying theme of "do we make our  
>own special purpose single-board computers or do we use generic PCs?"  
>  
>If you have a need for IP services from your packet radio modem, chances  
>are you have a computer speaking TCP/IP somewhere near it already. So  
>there is no "extra \$1000+" for the computer.

Exactly!! This is one of the more important aspects of the new Cylink product. It uses a user-supplied PC. However, even given that, its still much too expensive.

-- Dewayne

--

```
~~~~~
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>
Fax: (510) 770-9854 !
~~~~~
```

## 90. Re: [SS:1415] Re: SS Questions for Rule Filing

From: RLANIER@mailb.harris.com (RLANIER)  
Date: Wed, 14 May 1997 12:14:11 -0400  
To: ss@tapr.org  
Message-ID: <379e4fd0@mailb.harris.com>  
Rendered body type: text/plain

>Are these calculations taking into consideration the distance between  
>the two transceivers? Obviously, the distance is proportional to the  
>amount of interference. How can I accurately determine the dB  
>strength of a signal based upon its distance from my transceiver,  
>using the above calculations as a reference?

>The example I gave explicitly stated that the path losses were the same.  
>Obviously if the SS transmitter is much closer to the receiver than  
>the intended narrowband transmitter, then the interference contributed  
>by the SS transmitter will be much greater.

>Phil

I realized the answer to my question after I posted the message. I'm not sure what I was thinking when I wrote that note. Sorry about that.

I suppose my real intent of my EME question was to play devil's advocate: if a EME user builds an antenna that has alot of "leakage" on both sides of the main lobe, this could potentially interfere with weak signal, satellite users, especially if the EME user is pumping out 1500 watts. I just curious why the satellite and repeater people haven't complained about that, or have they?

Tony KE4ATO

---

## 91. Re: [SS:1422] Re: SS Questions for Rule Filing

From: Bob Nielsen <nielsen@primenet.com>  
Date: Wed, 14 May 1997 10:59:33 -0700 (MST)  
To: ss@tapr.org  
Message-ID: <Pine.LNX.3.96.970514104746.993A-100000@nielsen>  
Rendered body type: text/plain

On Wed, 14 May 1997, RLANIER wrote:

> I suppose my real intent of my EME question was to play devil's  
> advocate: if a EME user builds an antenna that has alot of "leakage"  
> on both sides of the main lobe, this could potentially interfere with  
> weak signal, satellite users, especially if the EME user is pumping  
> out 1500 watts. I just curious why the satellite and repeater people  
> haven't complained about that, or have they?

1. The antenna is reciprocal, so any significant leakage from the antenna would also result in receiving interference from other signals. Of course sidelobes and spillover are a fact of life that must be dealt with.

2. EME is not likely to be conducted on satellite or repeater frequencies. AFAIK, most EME operators are also considered part of the weak signal community (which is not the same as QRP.)

3. This is getting pretty off-topic.

Bob

----

|             |                                                                                 |
|-------------|---------------------------------------------------------------------------------|
| Bob Nielsen | Internet: nielsen@primenet.com                                                  |
| Tucson, AZ  | AMPRnet: w6swe@w6swe.ampr.org                                                   |
|             | AX.25: w6swe@wb7t1s.az.usa.noam                                                 |
|             | <a href="http://www.primenet.com/~nielsen">http://www.primenet.com/~nielsen</a> |

---

## 92. Re: [SS:1418] Re: To IP stack or to not IP Stack ?

From: "Dale Heatherington" <wa4dsy@wa4dsy.radio.org>  
Date: Wed, 14 May 97 15:21:42  
To: "ss@tapr.org" <ss@tapr.org>  
Message-ID: <199705141923.TAA98300@out1.ibm.net>  
Rendered body type: text/plain

On Wed, 14 May 1997 00:47:17 -0500 (CDT), Phil Karn wrote:

>Oh god, here we go again on the never-dying theme of "do we make our  
>own special purpose single-board computers or do we use generic PCs?"  
>

>If you have a need for IP services from your packet radio modem, chances  
>are you have a computer speaking TCP/IP somewhere near it already. So  
>there is no "extra \$1000+" for the computer.

Trouble is my computer talks PPP, SLIP or ethernet. It's hard to put the data into ax25 frames for 56k (or other) modems. To do it right I need an ax25 NDIS driver for my OS/2 box. Anybody want to write drivers for all the OSes out there? Didn't think so... On the other hand, if the TNC talked SLIP, PPP or ethernet I could hook my computer up with no additional drivers.

Right now the only way to get my OS/2 machines tcpip stack on AX25 is via JNOS running in a DOS emulator with it's own private ethernet card connected with coax to an second ethernet card in the same machine talking to OS/2s tcpip stack. This is a major kludge. I could run a separate DOS or Linux machine for this purpose but Linux or DOS isn't my primary OS so an extra machine would be required.

What about the new PDAs which have tcpip stacks. Do I have to hook a PDA to a DOS box just to access the ax25/tcpip network? This may be ok for home use but it kinda sucks in a car.

In conclusion, the missing link between todays PCs / PDAs and the ax25/tcpip network is a TNC that translates between the two. I want one BAD.

-----  
Dale Heatherington, WA4DSY  
e-mail - daheath@ibm.net  
Web page - <http://www.wa4dsy.radio.org>  
OS/2 Warp 4.0 The worlds finest desktop OS.

---

### 93. Re: [SS:1423] Re: SS Questions for Rule Filing

From: RLANIER@mailb.harris.com (RLANIER)  
Date: Wed, 14 May 1997 16:36:40 -0400  
To: ss@tapr.org  
Message-ID: <37a24050@mailb.harris.com>  
Rendered body type: text/plain

>> I suppose my real intent of my EME question was to play devil's  
>> advocate: if a EME user builds an antenna that has alot of "leakage"  
>> on both sides of the main lobe, this could potentially interfere with  
>> weak signal, satellite users, especially if the EME user is pumping  
>> out 1500 watts. I just curious why the satellite and repeater  
>people > haven't complained about that, or have they?

>1. The antenna is reciprocal, so any significant leakage from the antenna  
>would also result in receiving interference from other signals. Of course  
>sidelobes and spillover are a fact of life that must be dealt with.

>2. EME is not likely to be conducted on satellite or repeater  
>frequencies. AFAIK, most EME operators are also considered part of the  
>weak signal community (which is not the same as QRP.)

>3. This is getting pretty off-topic.

>Bob

The reason I used EME as an example is because it has the  
\*possibility\* to interfere with other Amateurs. This is the same  
arguement the weak signal (QRP) and satellite folks are saying about  
SS: it can \*possibily\* interfere with the existing status quo, hence  
the "not in my back yard" mentality. Its not out of the scope of this  
discussion to suggest what I did. I'm simply trying to draw a parallel  
arguement to the SS issues we have been discussing.

I think EME users are a breed apart, similar to SS experimenters in  
their quest to discover new frontiers. I hope to be a part of the  
first SS EME QSOs someday. Hence my choice of EME.

Tony KE4ATO

p.s. what does AFAIK stand for?

## 94. 97-12 Comments status

From: Dewayne Hendricks <dewayne@warpspeed.com>  
Date: Wed, 14 May 1997 14:18:41 -0700  
To: ss@tapr.org, ss-sta@tapr.org  
Message-ID: <v03102809af9fd9692ef0@[204.118.182.22]>  
Rendered body type: text/plain

In case anyone is interested, here is a list of all of the commenters on the SS NPRM, docket 97-12:

220 Spectrum Management Association of S. Cal.  
American Radio Relay League  
Buaas, Robert  
Carpenter, Robert J.: Central States VHF Society  
Johnson, Lyle  
Karn, Phil  
Metricom  
Part 15 Coalition  
Soifa, Rapheal  
TAPR  
Tynan, William

Note that this is a listing of all of the comments that the FCC has logged into their system since the comment deadline passed. If you filed comments on time and don't see your name here, I'd start to get concerned about what happened to them.

We now have all of the comments above and will have them up on the TAPR website as soon as we can. I will post an undated list of comments received at the FCC at the end of next week.

For those of you who filed comments, pro, con or whatever on the issue, you have our thanks!!

-- Dewayne  
Chair  
TAPR Regulatory Affairs Committee

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>
Fax: (510) 770-9854 !
~~~~~

## 95. Re: [SS:1419] Re: To IP stack or to not IP Stack ?

From: Jeff King / Kathy King <jeff@mich.com>  
Date: Wed, 14 May 1997 20:28:17 -0400  
To: ss@tapr.org  
Message-ID: <2.2.32.19970515002817.008cf7b4@mail.mich.com>  
Rendered body type: text/plain

At 01:31 AM 5/14/97 -0500, Greg Jones, WD5IVD wrote:

>Let me start with one question then.  
>  
>Can we agree that the radio and computer communicate via an Ethernet link.  
>I think we can, but I want to make sure we are going in the same direction  
>here.  
>(PLEASE no debate on serial connections on this thread!! from others).  
>

Why not ISA or PCI? It certainly can (would) be more cost effective than a stand alone ether net box, and frankly, would more closely fit the "ham" cost model (I think) we are striving for. Its also a model most of the Part 15 manufacturers have already addressed. History is a good teacher.... look at the TAPR NCP and the Gracillis box...and then compare there deployment versus open standards such as KA9Q nos based on the ISA/PC standard.

I'd focus on the MAC layer and forgo any direct implementations of a IP layer. Another advantage of a ISA/PCI based solution is you don't need a case.... a cost savings not be ignored.

>But why spend an extra \$1000+ for the computer to allow you to connect to  
>someone else Phil when we have a \$100 (Motorola has an embeded powerpc  
>chip with Ethernet controller integraetd available in low qty numbers for  
>around \$70-\$80) processor available on the radio that could easily support  
>it ? Then again we are going to have amateurs that will want to try to do

>this on a XT or 286 machine, or don't have the cash for 16Megs of memory to  
>do what is necessary.

Do we support the ham with a C-64 also? I just bought 16 megs of memory for \$79. I bought a 133mhz 486 MB with PCI/VLB for \$99. I think it is counterproductive to try and support the 'XT or 286' equipped amateur when reasonably fast hardware is available for next to nothing. Heck, most XT's/286's would be hard pressed to keep up with T1 rates anyways.

I'm not suggest the 'best' environment, but I am suggesting the model that will work the best in the amateur radio based environment. Design some sort of PCI and/or ISA based radio card.... possibly with the radio head remote able, and make it a open standard for both WIN95 and Linux with regards to development tools. Possibly look at the AMD MAC layer chips for the interface between the SS chips and the ISA/PCMCIA bus. Do not underestimate the cost of developing any embedded controller system..... they only make sense when you have very high volumes and a good marketing team, neither of which is likely.

I take it the renewed interest is because TAPR got the NSA grant? I don't think the marketplace should be ignored. Almost all dedicated ham radio routers have not been commercial successes. Learn from this and make a building block that someone can either use at home PC or incorporate into a PC/WIN95/UNIX system to make a router. Most hams are only interested in what technology can do for them, not what they can do for the community. You may not like hearing that, but it is reality. Hence, most of your sales will be to the end users NOT the eccentric node operators. Not withstanding, a open expandable product could fulfill both needs.

Regards,

```
-----  
| Jeff King      Aero Data Systems |  
| jeff@mich.com  P.O. Box 510895   |  
| (810)471-1787  Livonia, MI 48151 |  
| F(810)471-0279 United States     |  
-----
```

---

## 96. Subscribe

From: tjob@juno.com  
Date: Wed, 14 May 1997 20:35:00 EDT  
To: ss@tapr.org  
Message-ID: <19970514.203054.11471.0.tjob@juno.com>  
Rendered body type: text/plain  
[Empty message body]

---

## 97. Re: [SS:1426] 97-12 Comments status

From: Lyle Johnson <lylej@azstarnet.com>  
Date: Wed, 14 May 1997 18:12:00 -0700  
To: ss@tapr.org  
Message-ID: <3.0.32.19970514180603.00752e04@pop.azstarnet.com>  
Rendered body type: text/plain

At 04:25 PM 5/14/97 -0500, you wrote:

>  
> In case anyone is interested, here is a list of all of the  
>commenters on the SS NPRM, docket 97-12:  
>...  
> We now have all of the comments above and will have them up on the  
>TAPR website as soon as we can.

I look forward to seeing the ones not yet posted so I can write a reply comment.

Dewyane, and everyone involved in TAPR's efforts on the regulatory front, my sincere thanks for making it easier for folks like me to participate.

Cheers,

Lyle

---

## 98. AFAIK?

From: Tony McConnell <n3jly@erols.com>  
Date: Thu, 15 May 1997 00:44:15 -0400  
To: ss@tapr.org

Message-ID: <199705150444.AAA05271@smtp3.erols.com>

Rendered body type: text/plain

i would guess 'as far as i know'

but this is one mans opinion, i could be wrong.

see you all in dayton, my flight leaves at ten in the morning(or whenever i get there)

---

## 99. CDMA on satellite communication

From: "Basuki E. Priyanto" <priya@students.itb.ac.id>

Date: Thu, 15 May 1997 10:55:27 +0700 (JVT)

To: Phil Karn <karn@qualcomm.com>

Cc: ss@tapr.org

Message-ID: <Pine.BSI.3.96.970515105434.5835A-100000@students.itb.ac.id>

Rendered body type: text/plain

please help me ...

could you tell me literature about CDMA for satellite communication

thanks ..

\*\*\*\*\*

Best Regards,

BASUKI E. PRIYANTO

"Beat Spread Spectrum"

Mail:priya@itb.ac.id

\*\*\*\*\*

---

## 100. Re: [SS:1431] CDMA on satellite communication

From: RLANIER@mailb.harris.com (RLANIER)

Date: Thu, 15 May 1997 08:51:15 -0400

To: ss@tapr.org

Message-ID: <37b06ad0@mailb.harris.com>

Rendered body type: text/plain

>please help me ...

>could you tell me literature about CDMA for satellite communication

>thanks ..

>\*\*\*\*\*

>Best Regards,

>BASUKI E. PRIYANTO

>"Beat Spread Spectrum"

>Mail:priya@itb.ac.id

>\*\*\*\*\*

Exactly what do you mean by this?

"Beat Spread Spectrum"

---

## 101. Re: [SS:1427] Re: To IP stack or to not IP Stack ?

From: Steve Sampson <ssampson@claven.tinker.af.mil>

Date: Thu, 15 May 1997 08:32:30 -0500

To: ss@tapr.org

Message-ID: <337B106E.41C6@eds.tinker.af.mil>

Rendered body type: text/plain

Jeff King / Kathy King wrote:

>

> At 01:31 AM 5/14/97 -0500, Greg Jones, WD5IVD wrote:

>

> >Let me start with one question then.

> >

> >Can we agree that the radio and computer communicate via an Ethernet link.

> >I think we can, but I want to make sure we are going in the same direction

> >here.

Most of us were interested in the CrimeWave units.

You have the data in front of you for how many people would buy a radio modem configured that way.

Ethernet is good also.

1. Who sells embedded IP stacks.
2. What hardware do they require.
3. What is the unit cost.
4. What is the price for an IP black box versus a serial black box.
5. Would you be able to sell IP black box's in numbers that exceed break-even.

Options:

1. Contract someone to make a new IP stack for selected hardware.

> Why not ISA or PCI? It certainly can (would) be more cost effective  
> then a stand alone ether net box, and frankly, would more closely  
> fit the "ham" cost model (I think) we are striving for.

Absolutely not. How many Mac users ever bought a PI-2 card. How many people bought external devices versus internal devices.

---

## 102. Re: [SS:1433] Re: To IP stack or to not IP Stack ?

From: wpns@world.std.com (William Smith)  
Date: Thu, 15 May 1997 11:39:29 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <199705151539.AA21317@world.std.com>  
Rendered body type: text/plain

Steve Sampson sez:

- >1. Contract someone to make a new IP stack  
> for selected hardware.

What about a port of KA9Q? A SMOP, right?

--

Willie Smith wpns@world.std.com N1JBJ@amsat.org  
#define NII Information SuperCollider

---

## 103. Re: [SS:1433] Re: To IP stack or to not IP Stack ?

From: Jeff King / Kathy King <jeff@mich.com>  
Date: Thu, 15 May 1997 12:09:29 -0400  
To: ss@tapr.org  
Message-ID: <2.2.32.19970515160929.00a481ac@mail.mich.com>  
Rendered body type: text/plain

At 08:37 AM 5/15/97 -0500, Steve Sampson wrote:

>Jeff King / Kathy King wrote:

>

>> Why not ISA or PCI? It certainly can (would) be more cost effective  
>> then a stand alone ethernet box, and frankly, would more closely  
>> fit the "ham" cost model (I think) we are striving for.

>

>Absolutely not. How many Mac users ever bought a PI-2 card.

You'll never design a unit that will make everyone happy. The Mac people can drop the card in a LINUX box. The market is WIN95 and Linux, sorry if that makes MAC/C-64/Amiga/Atari/Timex people unhappy, but thats market realities. Anyways, don't the new Macs have a PCI bus? I think a good education on creeping featurism is to review the mail list TNC-TNG. This thread is mimicking that list.

>How

>many people bought external devices versus internal devices.

Lots. Just compare internal modem sales vs. external. Oh, did I forget to mention, I think any realistic future for amateur radio spread spectrum will come from outside the hobby. That's not to belittle any of those involved now, its just SS is a extremely small segment of the service. Hence I don't think those purchasing a unit will be hobbled by the black box mentality.

I think as far as market segment goes, a internal PCI vs external ethernet solution would be identical as far as sales in the ham radio market. Then you need to look at R&D/manufacturing costs as well as ongoing development. The internal solution clearly is the more cost effective solution. It also has the significant advantage of being programmable in-system, with user



obtainable development tools.

Any embedded controller based system will require a ICE (In Circuit Emulator) for development. Take a look at what happened to TAPR-TNC1 development when access was lost to the ICE for it. The internal solution will have lower up front costs and can have ongoing development done by the end users. Hence the internal solution is more likely to happen and prosper in the long term in the amateur radio market.

The only market that could afford the additional cost of the embedded ethernet solution would be the Part 15 wireless ISP field. And I strongly suspect those that advocate a embedded solution have this market in mind. Possibly the additional development costs could be born by these users and it would certainly get the volumes up.

But of course, this whole discussion is moot anyways. My design's target is PC-104/ISA and TAPR's NSF design will most likely be based on whatever the PI's decide they want to do. And you'll do whatever you think is best for your application.

Regards,

```
-----
| Jeff King      Aero Data Systems |
| jeff@mich.com  P.O. Box 510895   |
| (810)471-1787  Livonia, MI 48151  |
| F(810)471-0279 United States     |
-----
```

---

## 104. Re: IP Stack

From: Jim Jefferson <cjeffers@luminet.net>  
Date: Thu, 15 May 1997 11:17:00 -0500 (CDT)  
To: ss@tapr.org  
Message-ID: <Pine.GS0.3.95.970515111211.1346A-100000@luminet1.luminet.net>  
Rendered body type: text/plain

> Why not ISA or PCI? It certainly can (would) be more cost effective  
> > then a stand alone ether net box, and frankly, would more closely  
> > fit the "ham" cost model (I think) we are striving for.  
>  
> Absolutely not. How many Mac users ever bought a PI-2 card. How  
> many people bought external devices versus internal devices.

I agree 100% with this. I don't really care about the MacOS users but we need to consider internal vs external. You can't put an PCI card into a laptop or a Sparc. Now if we went with ethernet there is hardware already available. It would be simple to put an \$20 ethernet card in a computer and then connect it to the radio/modem/router.

Ethernet will be around for a long while also...

-Jim Jefferson KB0THN  
cjeffers@luminet.net  
<http://www.luminet.net/~cjeffers/>

---

## 105. Re: [SS:1436] Re: IP Stack

From: RLANIER@mailb.harris.com (RLANIER)  
Date: Thu, 15 May 1997 13:12:05 -0400  
To: ss@tapr.org  
Message-ID: <37b43f40@mailb.harris.com>  
Rendered body type: text/plain

Here we go again ...

---

Subject: [SS:1436] Re: IP Stack  
Author: ss@tapr.org at smtp  
Date: 5/15/97 11:23 AM

> Why not ISA or PCI? It certainly can (would) be more cost effective  
> > then a stand alone ether net box, and frankly, would more closely  
> > fit the "ham" cost model (I think) we are striving for.  
>  
> Absolutely not. How many Mac users ever bought a PI-2 card. How

> many people bought external devices versus internal devices.

I agree 100% with this. I don't really care about the MacOS users but we need to consider internal vs external. You can't put an PCI card into a laptop or a Sparc. Now if we went with ethernet there is hardware already available. It would be simple to put an \$20 ethernet card in a computer and then connect it to the radio/modem/router.

Ethernet will be around for a long while also...

-Jim Jefferson KB0THN  
cjeffers@luminet.net  
<http://www.luminet.net/~cjeffers/>

---

## 106. soapbox de n6gn

From: Glenn Elmore <ge@hpsadr2.sr.hp.com>  
Date: Thu, 15 May 1997 11:02:50 -0800 (PDT)  
To: ss@tapr.org  
Message-ID: <199705151802.AA088309371@hpsadr2.sr.hp.com>  
Rendered body type: text/plain

At the risk of continuing the thread past its usefulness, I'll use the question about SS and EME users to support the following thoughts.

/\* ascend soapbox \*/

I confess, I am a former amateur EME operator. In the mid '80s prior to delving into higher speed digital radio hardware I built and operated a 432 MHz EME station over 2-3 years and several EME contests. The transmitter ran about 650 watts output to a homebrew 24' stressed parabola. There are pictures of this antenna on the "antenna page": <http://www.tapr.org/~n6gn/antenna/antenna.html>  
The station made many contacts with 4-5 continents and was capable of hearing its own echos on SSB when conditions were good.

In addition to this two-way EME I also successfully monitored 1296 MHz activity with a smaller homebrew dish.

The station was located in Santa Rosa, CA about 50-80 miles north of the San Francisco Bay area which had a moderate amount of terrestrial activity on those bands. However, to my knowledge, there was never a QRM/congestion problem of any kind. In fact, the gain of a skyward-pointed EME dish is intentionally low toward the side (horizon) and back (earth). If this were not so, the system noise temperature would have been degraded by terra firma which is ~290 Kelvin. Comparing the rise in noise floor when the an EME antenna is pointed toward the horizon or ground with what it is when the antenna is pointed toward a "cold" spot in the sky is actually one of the best proofs of system performance EME operators use. With the very weak signals and tight link budgets of EME it is extremely helpful to have a way to know that the reason you don't hear anything "isn't you". Low sidelobes and good front/back antennas are part of EME.

Even copying other local EME stations running very high power isn't as easy as might be thought. Since both stations are typically working each other off the sides of their antennas which have considerable front/side ratio, even with high power signals aren't all that strong. On many occasions I have mistaken a local EME station (~50 miles away) for a signal off the moon because signals were so weak.

On the few occasions when I did point the dish at local terrestrial stations, signal strengths were indeed impressive. But even from a distance as large as the 50+ miles Santa Rosa is from most of the active community, antenna directivity was such that it wasn't possible to even \*copy\* all stations without moving the antenna. Terrestrial path losses combined with antenna patterns just don't allow the "band obliterating" signals that you might think. From my experience I would say that a good tropospheric duct tends to generate a lot more RF than EME stations. It sure generates a lot more interest!

Whether signals are SS or narrow, my experience even with high power levels and large ERPs is that small signals predominate. From most amateur locations I believe that the largest signals come from transmitters which run relatively low power and low gain antennas (like repeaters). It's possible to find exceptions to this but I think that this is what predominates.

/\* begin generalization \*/

So, amid all this speculation and discussion about narrow versus SS operation, IDing and QRM it is my opinion that there is a lot more fear of the unknown than there is experiential content. I've previously made the assertion that in the amateur environment getting \*enough\* signal over terrestrial paths to support high information content communications is a much bigger problem than QRM or congestion, or even mode/coding/FEC etc. See <http://www.tapr.org/~n6gn/dcc/problem.html> But, very likely, as large as this problem is, it is small compared to the political/social problem of convincing amateurs to share their resources.

Along with the wide/narrow coexistence topic there has been a lot of discussion on this list about interfaces to SS hardware, wishlists for an amateur SS radio and opinions of what "someone" ought to build. It seems to me that "someone" is us. I'm trying to do my part. If those who are interested in seeing amateur SS progress don't pursue the skills and resources necessary to design and develop physical layer (radio) hardware and enlist the help of others who have these skills then we can count on such progress not occurring. I don't believe that the few remaining amateur manufacturers will lead the way in this. If amateurs don't build the hardware then we must adapt someone else's. I question the potential for great contribution, extension to the state of the art or differentiation from existing commercial networks that can result from this approach.

If this is still about amateur radio, I think we had better get our collective hands dirty and design/develop \*radio\*. This is inextricably tied to regulatory, interface, and other higher layer issues but it rests on real, physical hardware. Those who are attracted to and excited by the potential for information age applications and uses for the hobby but who don't have the "RF" experience need to make alliances with other amateurs who do, share the excitement and work together. We need each other's strengths and we must collaborate to succeed.

/\* end generalization \*/  
/\* descend from soapbox \*/

Glenn Elmore n6gn

amateur IP: glenn@SantaRosa.ampr.org  
Internet: ge@sr.hp.com

```
|----- N6GN's Higher Speed Packet WWW Page -----|
|                                                         |
|      http://www.tapr.org/~n6gn/index.html              |
|                                                         |
|-----|
```

---

## 107. Re: [SS:1435] Re: To IP stack or to not IP Stack ?

From: Mike Murphree <n4cnw@ibm.net>  
Date: Thu, 15 May 1997 14:15:38 -0400  
To: ss@tapr.org  
Message-ID: <337B52CA.3427@ibm.net>  
Rendered body type: text/plain

Jeff King / Kathy King wrote:

> You'll never design a unit that will make everyone happy. The Mac people  
> can drop the card in a LINUX box. The market is WIN95 and Linux, sorry  
> if that makes MAC/C-64/Amiga/Atari/Timex people unhappy, but thats  
> market realities. Anyways, don't the new Macs have a PCI bus?  
> I think a good education on creeping featurism is to review the mail  
> list TNC-TNG. This thread is mimicking that list.

This thread also does not appear to be making any more progress than the TNC-TNG list did either. There were \*way\* too many conflicting interests to accomplish \*anything\*. But for what, it's worth I wouldn't go for an internal solution. There is too much trouble already in getting extra cards to work in Plug-N-Pray systems. If I use ethernet, I only need one I/O address and IRQ for what could be thousands of controllers, for serial ports (or possibly plug-in cards) I need one for \*each\* controller.

> Oh, did I

> forget to mention, I think any realistic future for amateur radio  
> spread spectrum will come from outside the hobby. That's not to  
> belittle any of those involved now, its just SS is a extremely  
> small segment of the service. Hence I don't think those purchasing  
> a unit will be hobbled by the black box mentality.

Possibly more for economic reasons than technical... I can't afford to go out and buy a Sun UltraSPARC, Mentor Graphics DA and QuickHDL, and FPGA programmers for home use and the company takes a dim view of me using the ones at work for anything personal these days.

> development. The internal solution clearly is the more cost  
> effective solution. It also has the  
> significant advantage of being programmable in-system, with user  
> obtainable development tools.  
>  
> Any embedded controller based system  
> will require a ICE (In Circuit Emulator) for development. Take a look  
> at what happened to TAPR-TNC1 development when access was lost to the  
> ICE for it. The internal solution will have lower up front costs and  
> can have ongoing development done by the end users. Hence the  
> internal solution is more likely to happen and prosper in the long  
> term in the amateur radio market.

Things have changed a great deal since those days. Lots of processors have their own flavor of internal debug port capability now. A wealth of free GNU development software also exists for many of the same processors.

This was mentioned on TNC-TNG a long time ago but seemed to fall on deaf ears.

Somewhere, I have seen a web page with an HC11 processor (granted underpowered) on a board with an accompanying ethernet chip... This was \*not\* an expensive design. It also had the capability of being operated with any computer with an ethernet port.

> The only market that could  
> afford the additional cost of the embedded ethernet solution would be the  
> Part 15 wireless ISP field. And I strongly suspect those that advocate  
> a embedded solution have this market in mind. Possibly the additional  
> development costs could be born by these users and it would certainly  
> get the volumes up.

Not at all... I'd like to see \*less\* commercial involvement since I can point to 3 or 4 ham related projects that have been moved into commercial production at prices that are way out of reason.

> But of course, this whole discussion is moot anyways. My design's target  
> is PC-104/ISA and TAPR's NSF design will most likely be based on whatever  
> the PI's decide they want to do. And you'll do whatever you think is  
> is best for your application.

Yeah, it's getting plumb silly just like it did on the TNC-TNG list almost 2 years ago now.

73  
Mike N4CNW

---

## 108. Internal vs External

From: Jim Jefferson <cjeffers@luminet.net>  
Date: Thu, 15 May 1997 13:55:40 -0500 (CDT)  
To: ss@tapr.org  
Message-ID: <Pine.GS0.3.95.970515135212.6899A-100000@luminet1.luminet.net>  
Rendered body type: text/plain

Isn't it more important to actually get something going before we debate of this subject though? I'm a no-nothing in terms of this sort of thing but wouldn't line drivers (not the right name but...) be supporting hardware?

Maybe we could come up with a box where we plug the ISA card in and it comes out as an ethernet port... Keep everyone happy

Anyhow lets worry about the task at hand.

## 109. Re: [SS:1422] Re: SS Questions for Rule Filing

From: Phil Karn <karn@qualcomm.com>  
Date: Thu, 15 May 1997 04:46:07 +0000 (UTC)  
To: ss@tapr.org  
Message-ID: <m0wRsQZ-000Rw0C@laptop.ka9q.ampr.org>  
Rendered body type: text/plain

I suppose my real intent of my EME question was to play devil's advocate: if a EME user builds an antenna that has alot of "leakage" on both sides of the main lobe, this could potentially interfere with weak signal, satellite users, especially if the EME user is pumping out 1500 watts. I just curious why the satellite and repeater people haven't complained about that, or have they?

This is quite true. It hasn't been a problem so far because the EME users tend to stay in a small dedicated part of the band so they won't bother anybody else. If they begin to use wider modes, they'll have to be more careful.

Phil

---

## 110. Re: [SS:1437] Re: IP Stack

From: "Lee W. Fry" <lfry@mindspring.com>  
Date: Thu, 15 May 1997 21:54:21 -0400  
To: ss@tapr.org  
Message-ID: <2.2.32.19970516015421.003863a0@mindspring.com>  
Rendered body type: text/plain

A big problem is always line loss from the transceiver to the antenna. If the transceiver has a twisted pair ethernet interface, then it can be way out there where the antenna is. All we need is a way to get DC power to it. One way would be to use unused pairs from a four pair cable.

Means we need to pay attention to environmental specs though to use it like this.

One problem with putting an IP stack in it is you need a way to administer it. Things like telling it what it's address is, routes, etc. Could be done in-band (SMTP, or how about it having it's own http server like some of the new printers?), out-of-band (with a serial port) or even with some kind of local entry device (anything from dip switches to a LCD display with a menu driven entry system.

AS many point out, if it is a PCI/ISA/whatever card, you can certainly wrap a cheap computer around it or use the one you have. Be kinda hard to put it up there on the tower though.

Lee - AA0JP

---

## 111. Re: [SS:1442] Re: IP Stack

From: Jeff King / Kathy King <jeff@mich.com>  
Date: Thu, 15 May 1997 23:33:21 -0400  
To: ss@tapr.org  
Message-ID: <2.2.32.19970516033321.008ffb2c@mail.mich.com>  
Rendered body type: text/plain

At 08:56 PM 5/15/97 -0500, Lee W. Fry wrote:

>  
>AS many point out, if it is a PCI/ISA/whatever card, you can certainly wrap  
>a cheap computer around it or use the one you have. Be kinda hard to put it  
>up there on the tower though.  
>  
>Lee - AA0JP  
>

You don't. You have a remote mounted pre-amp/amp just like all the amsat folks have used for years as well as most of the Part 15 consultants use. Or you have the RF head remote mountable. Or you bite the bullet and use something a bit better then RG-58 for your feedline.

Regards,

-----  
| Jeff King            Aero Data Systems |

| jeff@mich.com P.O. Box 510895 |  
| (810)471-1787 Livonia, MI 48151 |  
|F(810)471-0279 United States |  
-----

---

## 112. HAmPS Home Page

From: Marty Albert <marty@trucom.com>  
Date: Fri, 16 May 1997 00:48:57 -0500  
To: packet-pbbs@qsl.net, aprssig@tapr.org, bbssig@tapr.org, hfsig@tapr.org,  
netsig@tapr.org, ss@tapr.org  
Message-ID: <1.5.4.32.19970516054857.0069a7b8@mail.trucom.com>  
Rendered body type: text/plain

This message is to announce the new Heartland AMateur Packet Society (HAmPS)  
Home Page located at URL:

<http://www.geocities.com/CapeCanaveral/Lab/7067>

HAmPS is a group that facilitates packet radio network development with a  
focus on operations in the Heartland of the United States.

Membership is FREE and open to all interested parties.

Please drop by the HAmPS Home Page for more information.

Take Care & 73

Marty Albert - [marty@trucom.com](mailto:marty@trucom.com)  
Amateur Radio: KC6UFM@KC6UFM.#SEMO.MO.USA.NOAM

Heartland Internet Services

\*\*\*\*\*  
Interested in Amateur Radio?  
<http://www.trucom.com/ppages/marty>  
\*\*\*\*\*

---

## 113. Re: IP Stack

From: Steve Sampson <ssampson@cool.site.net>  
Date: Fri, 16 May 1997 09:09:07 -0500  
To: ss@tapr.org  
Message-ID: <337C6A83.57E7@cool.site.net>  
Rendered body type: text/plain

Kathy King wrote:

> I think a good education on creeping featurism is to review the mail  
> list TNC-TNG. This thread is mimicking that list.

I agree. Go read that junk, it has all been said before.

I think Greg has the right idea, press on.

As for how you would control an IP Black box? You would do it  
like the Telnet Servers do it. Add an ARP entry into your table  
with the Ethernet address label on the back of the unit. Then add  
an IP address and hostname into your hosts or DNS, and then  
ping the unit. The unit detects it's Ethernet address and grabs  
the IP address offered.

Steve

---

## 114. Re: [SS:1445] Re: IP Stack

From: darnell@binmedia.com (Darnell Gadberry)  
Date: Fri, 16 May 97 09:11:59 -0700  
To: <ss@tapr.org>  
Message-ID: <19970516160522002.AAA122@[206.117.173.2]>  
Rendered body type: text/plain

On 5/16/97 Steve Sampson wrote:

>As for how you would control an IP Black box? You would do it  
>like the Telnet Servers do it. Add an ARP entry into your table  
>with the Ethernet address label on the back of the unit. Then add  
>an IP address and hostname into your hosts or DNS, and then  
>ping the unit. The unit detects it's Ethernet address and grabs  
>the IP address offered.  
>

Phar Lap Software publishes an embedded Win32 compatible operating system called Realtime ETS. Since it is Win32 compatible you can use any of the popular PC C/C++ development systems to write code. Additionally, It features a complete TCP/IP stack, PPP drivers, Ethernet drivers, and a HTTP (Web) server. Plus, the whole thing fits in < 256 Kb! It supports 80286 or better Intel processors.

The software development kit is priced at \$4,995 and the per-unit licenses in our quantities would be somewhere around \$8 - \$12 per unit.

- darnell gadberry ke6ucl  
binaryMedia Communications  
darnell@binmedia.com

---

## 115. Re: [SS:1445] Re: IP Stack

From: Jeff King <jeff@mich.com>  
Date: Fri, 16 May 1997 13:12:17 -0400  
To: ss@tapr.org  
Message-ID: <2.2.32.19970516171217.0090f894@mail.mich.com>  
Rendered body type: text/plain

At 09:12 AM 5/16/97 -0500, Steve Sampson wrote:

>Jeff King wrote:

>

>> I think a good education on creeping featurism is to review the mail

>> list TNC-TNG. This thread is mimicking that list.

>

>I agree. Go read that junk, it has all been said before.

>

>I think Greg has the right idea, press on.

>

>Steve

You say you understand what I am saying Steve, but I don't think so. I believe a short history lesson is in order for you to help you understand my point. TNC-TNG started with a simple premise.... to extend the software of the TNC2 to be more friendly to computers that can talk SLIP. Then creeping featurism entered the frey... ultimately ending up (almost) exactly where we are now. A 'free standing' IP blackbox with a integrated radio talking ethernet. And you know what, it never got built and much more sadly, the creeping featurism discouraged those that actually were working on extending the capabilities of the TNC2. One should attempt to learn from history and not continue to go down the same meaningless path.

Am I saying a stand alone ethernet/radio IP router box is a bad idea? Of course not (although I think it should be 100baseT, not 10baseT). What I am saying, is I believe it is beyond the capabilities of a ad-hoc group of amateurs. How many on this mailing list have taken a product COMPLETELY from design concept, coding, PCB layout, production and on to sales? How many are will to volunteer their time and equipment to make it so? I'm not talking about your college project or something you do as a hobby. I'm talking about something you did as a entrepreneur or at a small company. I know I could count the people that have done this (on this list) on one hand, and I don't think anyone in that group has chosen to comment yet. And frankly, while I have taken my product designs completely through the cycle, I don't think I would be willing to contribute significant amounts of my time and resources for free.

I firmly believe in the KISS principle, as long as it makes sense. While my PCI/ISA suggestion is not the most elegant, it can be made to suit every concern I have seen here. More importantly, it fits the bulk of the marketplace as is, its simpler to make and is more scalable. TAPR's present revenues come off of royalties and kit sales. Hence given what I know about TAPR, it seems to me TAPR should target items that have a chance of selling more then 50 pieces.

Now that could all change in a heartbeat, as I have no idea if TAPR got the NSF grant as Greg didn't comment on that. With that kind of seed money, people could be paid to develop a IP switch/blackbox. And from what little I understand, the proposed NSF grant is a radio device for the general purpose market, hence the volume would be there to support a affordable end user price. But of course, unless someone from TAPR cares to confirm or deny the above, all this is hearsay. What say Greg?

Beyond that, the point (or at least my point) is to suggest something that at least has a chance of being a commercial success in the HAM RADIO

marketplace (note I am not including the PART15 marketplace). What is lacking in the HAM RADIO marketplace is a spread spectrum radio. We already have ethernet IP routers in the form of LINUX/KA9Q NOS as well as a significant software labor pool enhancing that software. Focus on what we really need instead of a utopia that may not make financial sense. Understanding that, if you still want to yadda yadda yadda about the perfect widget, then have at it. As much as everyone wants to ignore it, the marketplace does rule.

Regards,

```
-----
| Jeff King      Aero Data Systems |
| jeff@mich.com  P.O. Box 510895   |
| (810)471-1787  Livonia, MI 48151 |
| F(810)471-0279 United States     |
-----
```

---

## 116. Re: IP Stacks -- Pacific Softworks Home Page

From: Steve Sampson <ssampson@cool.site.net>  
Date: Fri, 16 May 1997 12:31:13 -0500  
To: ss@tapr.org  
Message-ID: <337C99E1.47F7@cool.site.net>  
Rendered body type: text/plain

Embedded TCP/IP, PPP, etc, for typical chipsets:

<http://www.pacificsw.com/>

---

## 117. Re: [SS:1447] Re: IP Stack

From: Steve Sampson <ssampson@cool.site.net>  
Date: Fri, 16 May 1997 15:45:41 -0500  
To: ss@tapr.org  
Message-ID: <337CC775.54B7@cool.site.net>  
Rendered body type: text/plain

Jeff King wrote:

>

> You say you understand what I am saying Steve, but I don't think so. I believe  
> a short history lesson is in order for you to help you understand my point.  
> TNC-TNG started with a simple premise.... to extend the software of the  
> TNC2 to be more friendly to computers that can talk SLIP. Then creeping  
> featurism entered the frey... ultimately ending up (almost) exactly where  
> we are now. A 'free standing' IP blackbox with a integrated radio talking  
> ethernet. And you know what, it never got built and much more sadly, the  
> creeping featurism discouraged those that actually were working on extending  
> the capabilities of the TNC2. One should attempt to learn from history  
> and not continue to go down the same meaningless path.

My writing style evidently puts people off, but I am not a know-it-all,  
far

from it. My background as a Ham is limited. My bottom line in any  
message,

is a simple analysis of what's going on. I can be easily swayed on  
technology,

because my company, and my work surrounds that which was designed and  
built

5 - 10 years ago. You're right, I missed your point.

I think Greg [please correct me if I'm wrong] is starting out with an  
idea of

a black box high speed modem (voice and data). TNC-TNG on the other  
hand

started out as a TNC-2 replacement. I see it as two ends of the  
spectrum (no

pun intended). Therefore I only point out that black boxes are best  
left

black boxes and not have a Bus architecture. Then you have to decide  
how to

interface the black box. Suffice to say, ethernet is the standard.

Laptops

are being built with PCMCIA cards now. In the end, the SS modem should  
be

a PCMCIA card. Until then, an asynchronous serial PCMCIA card is about  
the

same cost as an ethernet PCMCIA card. Plus all the Unix and Windows,  
and Mac



stuff out there. It's just an observation, not a position.

Steve

---

## 118. Re: [SS:1442] Re: IP Stack

From: Jerry Normandin <jerryn@ici.net>  
Date: Fri, 16 May 1997 23:09:11 -0400  
To: ss@tapr.org  
Message-ID: <337D2157.7E8E2048@ici.net>  
Rendered body type: text/plain

Jerry Replies:

Why all the fuss? I use a NECWaveLAN card, drive 100 ft. of LRM400 cable, have a 25dB bilateral amplifier mounted right on the Linear Phased Array Antenna. I can do 26 miles (only limited by the curve of the earth!) No need for 100 Watts.. this is all done at 10 Watts. We all know how low the Spectral Power Density is.. we are talking low power! I use the Linux Operating System and my fixed/mobile router code.

Lee W. Fry wrote:

>  
> A big problem is always line loss from the transceiver to the antenna. If  
> the transceiver has a twisted pair ethernet interface, then it can be way  
> out there where the antenna is. All we need is a way to get DC power to it.  
> One way would be to use unused pairs from a four pair cable.  
>  
> Means we need to pay attention to environmental specs though to use it like  
> this.  
>  
> One problem with putting an IP stack in it is you need a way to administer  
> it. Things like telling it what it's address is, routes, etc. Could be  
> done in-band (SMTP, or how about it having it's own http server like some of  
> the new printers?), out-of-band (with a serial port) or even with some kind  
> of local entry device (anything from dip switches to a LCD display with a  
> menu driven entry system.  
>  
> AS many point out, if it is a PCI/ISA/whatever card, you can certainly wrap  
> a cheap computer around it or use the one you have. Be kinda hard to put it  
> up there on the tower though.  
>  
> Lee - AA0JP

---

## 119. Re: [SS:1441] Re: SS Questions for Rule Filing

From: Jerry Normandin <jerryn@ici.net>  
Date: Fri, 16 May 1997 23:16:09 -0400  
To: ss@tapr.org  
Message-ID: <337D22F9.A9B93B17@ici.net>  
Rendered body type: text/plain

All I need is 10 Watts per hop. The spectral power density is low since we are using Spread Spectrum. No need for 1800 watts... shit, what are you going to talk to... some mole uderground? There is a limit... the curve of the earth? even at 1800 Watts at 100' you are only going to get 26 miles or so! You need height.... not power!

I would like to push 10 Watts off of my tethered blimp at 500' and have someone else do the same in Bermuda.... I bet it will work (I am in New England .. by the east coast)

Phil Karn wrote:

>  
> I suppose my real intent of my EME question was to play devil's  
> advocate: if a EME user builds an antenna that has alot of "leakage"  
> on both sides of the main lobe, this could potentially interfere with  
> weak signal, satellite users, especially if the EME user is pumping  
> out 1500 watts. I just curious why the satellite and repeater people  
> haven't complained about that, or have they?  
>  
> This is quite true. It hasn't been a problem so far because the EME users  
> tend to stay in a small dedicated part of the band so they won't bother  
> anybody else. If they begin to use wider modes, they'll have to be  
> more careful.  
>  
> Phil

---

## 120. Re: CDMA on satellite communication

From: Phil Karn <karn@qualcomm.com>  
Date: Fri, 16 May 1997 18:03:39 +0000 (UTC)  
To: priya@students.itb.ac.id  
Cc: ss@tapr.org  
Message-ID: <m0wSRLv-000Rw0C@laptop.ka9q.ampr.org>  
Rendered body type: text/plain

>could you tell me literature about CDMA for satellite communication

This is a pretty broad subject (pun intended). A good general reference is the IEEE reprint "Multiple Access Communications". It came out in 1991 or so. It has a good section on spread spectrum.

Phil

---

## 121. Re: [SS:1451] Re: SS Questions for Rule Filing

From: Jeff King / Kathy King <jeff@mich.com>  
Date: Sat, 17 May 1997 11:33:52 -0400  
To: ss@tapr.org  
Message-ID: <2.2.32.19970517153352.008bb0f0@mail.mich.com>  
Rendered body type: text/plain

Jerry:

EME stands for Earth Moon Earth. The 'hop' these folks are trying to cover is 500,000+ miles (2X times the distance to the moon) which allows them to talk to the opposite ends of the earth (up to 12,000 miles). The moon is not a very good reflector, hence the need for such high power/erp.

-Jeff

At 10:31 PM 5/16/97 -0500, Jerry Normandin wrote:

>All I need is 10 Watts per hop. The spectral power density is low  
>since we are using Spread Spectrum. No need for 1800 watts... shit,  
>what are you going to talk to... some mole uderground? There is a  
>limit... the curve of the earth? even at 1800 Watts at 100' you are  
>only going to get 26 miles or so! You need height.... not power!  
>

>I would like to push 10 Watts off of my tethered blimp at 500'  
>and have someone else do the same in Bermuda.... I bet it will work  
>(I am in New England .. by the east coast)  
>

>

>

>Phil Karn wrote:

>>

>> I suppose my real intent of my EME question was to play devil's  
>> advocate: if a EME user builds an antenna that has alot of "leakage"  
>> on both sides of the main lobe, this could potentially interfere with  
>> weak signal, satellite users, especially if the EME user is pumping  
>> out 1500 watts. I just curious why the satellite and repeater people  
>> haven't complained about that, or have they?  
>>

>> This is quite true. It hasn't been a problem so far because the EME users  
>> tend to stay in a small dedicated part of the band so they won't bother  
>> anybody else. If they begin to use wider modes, they'll have to be  
>> more careful.

>>

>> Phil

>

>

---

## 122. Re: [SS:1446] Re: IP Stack

From: Dirk Koopman <djk@tobit.co.uk>  
Date: Mon, 19 May 1997 09:47:25 +0100 (BST)  
To: ss@tapr.org  
Message-ID: <Pine.LNX.3.95.970519093141.30284G-100000@dirku.tobit.co.uk>  
Rendered body type: text/plain

On Fri, 16 May 1997, Darnell Gadberry wrote:

> On 5/16/97 Steve Sampson wrote:

>

> >As for how you would control an IP Black box? You would do it  
> >like the Telnet Servers do it. Add an ARP entry into your table

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> >with the Ethernet address label on the back of the unit. Then add
> >an IP address and hostname into your hosts or DNS, and then
> >ping the unit. The unit detects it's Ethernet address and grabs
> >the IP address offered.
> >
> >
> Phar Lap Eoftware publishes an embedded Win32 compatible operating system
> called Realtime ETS. Since it is Win32 compatible you can use any of the
> popular PC C/C++ development systems to write code. Additionally, It
> features a complete TCP/IP stack, PPP drivers, Ethernet drivers, and a
> HTTP (Web) server. Plus, the whole thing fits in < 256 Kb! It supports
> 80286 or better Intel processors.
> >
> The software development kit is priced at $4,995 and the per-unit
> licenses in our quantities would be somewhere around $8 - $12 per unit.
> >

```

Being an old skin-flint and this being amateur radio I would have thought something like Xinu or RTEMS would have been more appropriate. They are free, available in source and have a stack.

Someone has said that the reason things haven't been done is because we are trying to do too much at once. The trouble is I think what people are actually looking for is the new 'killer' TNC which will do for SS what the TNC2 did for packet.

The problem is that IS just that much harder because people's expectations have been increased both by use of tncs and the internet. They don't want (and most can't) "fiddle" with the technology, it beyond most of them - not just from a software or modem hardware point of view but also more basically on the RF side. How many people on this list has any serious test gear for bands above 70cms and (as I have no choice) especially bands above 1000Mhz.

What it then comes down to (unfortunately) is a black box. The only way this is likely to happen is if some competent volunteer can find the time to do it. That means taking time out from the (similar) job they are already probably doing and (probably) convincing themselves that this could be a commercial success or failing that, a technology learning tool that at least pays most of the direct costs in producing it. Having done this sort of thing in past, I realise it ain't quick or cheap - but neither need it be prohibitively expensive.

```

--
Dirk-Jan Koopman      Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant   Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than
the piano when played by a sister or near relation." --Oscar Wilde

```

---

## 123. Re: [SS:1454] Re: IP Stack

```

From: frussle@erols.com (Jake Brodsky)
Date: Mon, 19 May 1997 19:52:25 GMT
To: ss@tapr.org
Message-ID: <3381996b.21098554@smtp.erols.com>
Rendered body type: text/plain

```

Allow me to introduce myself. I'm the other guy that Tony, N3JLI, is working with on building a spread spectrum radio. I've been lurking on and off for some time on the SS mail list. Tony e-mails me the interesting stuff. But lately, I thought I'd rejoin the list to see what's new for myself. I have an observation to make:

```
/* BEGIN SOAPBOX */
```

Toward the end of that wonderfully funny series of books Douglas Adams wrote, beginning with "The Hitch-Hiker's Guide to the Galaxy," there was a scene where all the humans crash-landed on pre-historic Earth. These humans were the folks who couldn't lead nor do anything particularly useful in their society: The bureaucrats, advertising executives, lawyers, and so on. Those who survived the crash landing on earth were suffering from cold and starvation. They knew they needed warmth and food. They had heard of this thing called "fire." So they did market research on "fire."

What was this fire thing? How should it be sold? Should it be inserted nasally? Would anyone want a pocket fire? Who should use fire? Should it be licensed? These were the sort of things they couldn't decide. They spent weeks and weeks in committee like this until eventually they devolved to near savagery and those few

surviving earthlings re-discovered fire.

Doesn't this sound like the great interface debate for a spread spectrum radio? Does anyone arguing this issue know enough to actually build this interface? Does anyone have a working spread spectrum radio?

Frankly this debate got old several months ago when I first signed up. I thought the folks who were pursuing this secondary issue would have gotten over it by now. I was wrong. Were this a newsgroup, I'd have made up a kill filter long ago. Please folks, leave the interface issue alone until someone actually has a working radio.

Then I'll care.

/\* END SOAPBOX \*/

73,

Jake Brodsky, AB3A <mailto:frussle@erols.com>  
"Beware of the massive impossible!"

---

## 124. Re: [SS:1435] Re: To IP stack or to not IP Stack ?

From: "Greg Jones, WD5IVD" <[wd5ivd@tapr.org](mailto:wd5ivd@tapr.org)>  
Date: Mon, 19 May 1997 15:20:42 -0500  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <[v0302090cafa6668058e4@\[128.83.113.132\]](mailto:v0302090cafa6668058e4@[128.83.113.132])>  
Rendered body type: text/plain

>My design's target is PC-104/ISA

When can you post more about your approach Jeff ?

Cheers - Greg

-----  
Greg Jones, WD5IVD  
Austin, Texas  
[wd5ivd@tapr.org](mailto:wd5ivd@tapr.org)  
<http://www.tapr.org/~wd5ivd>  
-----

---

## 125. Re: [SS:1456] Re: To IP stack or to not IP Stack ?

From: Jeff King <[jeff@mich.com](mailto:jeff@mich.com)>  
Date: Mon, 19 May 1997 23:07:25 -0400  
To: [ss@tapr.org](mailto:ss@tapr.org), [wd5ivd@tapr.org](mailto:wd5ivd@tapr.org)  
Message-ID: <[2.2.32.19970520030725.00963a00@mail.mich.com](mailto:2.2.32.19970520030725.00963a00@mail.mich.com)>  
Rendered body type: text/plain

At 04:04 PM 5/19/97 -0500, Greg Jones, WD5IVD wrote:

>>My design's target is PC-104/ISA

>

>When can you post more about your approach Jeff ?

>

>Cheers - Greg

Not to much to post.... I'm considering taking the Harris reference design for PCMCIA and moving it over to PC/104 (ISA is quite similar). This is for a commercial design for one of my customers, so I'll have to see about making it available for hobbyists, but if it happens this should be possible. They (harris) use the AMD radio MAC layer chip, which supposedly will work on either the ISA or PCMCIA buss. Nice thing about it is the WIN95 drivers are already written. Needless to say, there is not a whole lot original here. First I need to finish up a PC/104 automotive power supply design, but that should be wrapped up in the next week or two.

Right now I am using Xircom (Now Netwave) PCMCIA 2.5ghz frequency hopping SS modems. The application is for downloading GPS data from city (transit) buses when the buses come near the bus terminal. I've got about 300 deployed so far. With the Xircom's I need to buy a PC/104 to PCMCIA adapter in addition to the cost of the Xircom. Hence my interest in a direct PC/104 interface. The Xircom's only have about a 1/4 mile range, mostly due to there low power (25mw) and integral antenna. I'd of course make a external antenna connector and see about running a bit more

power. Likely I'd put the amp right at the antenna. And yes, power control is part of any design I do. I believe that it is standard (or at least the ability) is also standard with the Harris chip set.

Ran across a interesting module today, a potted 386SX with ISA, IDE, Floppy, 512K flash, 2meg dram, 2 serial, 1 parallel all on a module about 2"X2" running at 40mhz. Claim that you can use standard development tools. Price at 1000piece qty's was \$104 each. You need to drop some ethernet glue chips on its ISA buss for what you want, but might make a good crossover product that in its "canned" mode could serve the educational community while allowing enough hooks for continued development/expansion for the amateur radio side. BTW, it also included a embedded DOS and BIOS with no additional royalties. I left the ad off site (and can't remember the name) but they are supposed to send me more info.

Regards,

```
-----
| Jeff King      Aero Data Systems |
| jeff@mich.com  P.O. Box 510895   |
| (810)471-1787  Livonia, MI 48151 |
| F(810)471-0279 United States     |
-----
```

---

## 126. [HFSIG:2113] Negative SNR, SS and FEC.

From: RLANIER@mailb.harris.com (RLANIER)  
Date: Thu, 22 May 1997 10:28:23 -0400  
To: ss@tapr.org  
Message-ID: <38458730@mailb.harris.com>  
Rendered body type: text/plain

These questions were posed on the HFSIG mail list. I thought someone on this list might be able to answer his questions.

Tony

---

Subject: [HFSIG:2113] Negative SNR, SS and FEC.  
Author: hfsig@tapr.org at smtp  
Date: 5/22/97 2:12 AM

Does someone have the time to explain the following in layman's terms:(or perhaps in undergrad maths :-)

1. It is said that a spread spectrum system can work at negative SNR's. How does this tie in with Shannons Limit of -1.6dB ?

2. What is the difference between spread spectrum process gain and coding gain that one can obtain from say Viterbi FEC ?

Just wondering, the SETI thread has made me think about it.

Danie

---

## 127. Re: [SS:1458] [HFSIG:2113] Negative SNR, SS and FEC.

From: hbaker@netcom.com (Henry G. Baker)  
Date: Thu, 22 May 1997 10:02:26 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705221702.KAA24585@netcom23.netcom.com>  
Rendered body type: text/plain

> Does someone have the time to explain the following in layman's  
> terms:(or perhaps in undergrad maths :-)  
>  
> 1. It is said that a spread spectrum system can work at negative SNR's.  
> How does this tie in with Shannons Limit of -1.6dB ?

SS systems utilize waveforms that have low correlations with other SS waveforms, and also noise. If you are willing to use very long sequences and accumulate over a very long time, you can pull the signal out of a lot of noise. In fact, GPS receivers do this all the time.

Don't try to read too much into Shannon's channel equation, but look

to the reasoning in the proof -- it gives far more insight than the equation.

> 2. What is the difference between spread spectrum process gain and  
> coding gain that one can obtain from say Viterbi FEC ?

As Dixon says, redundant error correction codes are a very mild form of SS. Turning this around, the coding people have long studied the properties of 'random' codes, since the algebra people had trouble coming up with synthetic codes of really big minimum distances between code-words. So the ideas are really very similar, and there is a continuum between redundancy codes and SS codes.

--  
Henry Baker  
www/ftp directory URL:  
ftp://ftp.netcom.com/pub/hb/hbaker/home.html

---

## 128. Re: [SS:1458] [HFSIG:2113] Negative SNR, SS and FEC.

From: jra1854@ntech.edu (Jeffrey Austen)  
Date: Thu, 22 May 1997 15:49:59 -0600  
To: ss@tapr.org  
Cc: hfsig@tapr.org, RLANIER@mailb.harris.com (RLANIER)  
Message-ID: <v01540b00afaa69adf08d@[149.149.39.26]>  
Rendered body type: text/plain

>Does someone have the time to explain the following in layman's  
>terms:(or perhaps in undergrad maths :-)  
>  
>1. It is said that a spread spectrum system can work at negative SNR's.  
>How does this tie in with Shannons Limit of -1.6dB ?

Both are correct. The confusion arises because they refer to two different measurements.

Shannon's limit states that reliable communication can be obtained with  $E_b/N_0 \geq -1.6$  dB.  $E_b$  is the energy per data bit (before error correction coding -- coding may make the bit or symbol rate in the channel different than the actual data rate) and  $N_0$  is the noise power spectral density.

SNR is signal to noise ratio, that is signal power divided by noise power.

$E_b/N_0$  is related to SNR by the data rate and the effective noise bandwidth. The following relates SNR to  $E_b/N_0$ .  $P_s$  is signal power and  $P_n$  is noise power. (The noise power spectral density is assumed to be constant.)

|       |           |       |
|-------|-----------|-------|
| $P_s$ | Bit Rate  | $E_b$ |
| --    | -----     | X     |
| $P_n$ | Bandwidth | $N_0$ |

In a spread-spectrum system the same power is spread out over a much larger bandwidth. From the above it can be seen that if the bandwidth is increased by a factor of one-hundred that the SNR will decrease by the same amount. Thus the SNR can be negative while  $E_b/N_0$  is positive.

>2. What is the difference between spread spectrum process gain and  
>coding gain that one can obtain from say Viterbi FEC ?

Process gain and coding gain are different things. Process gain is a measure of the amount of "spreading" which is done to the signal. It is directly related to the interference rejection capabilities. If the channel is ideal (additive white Gaussian noise, no interference, no fading) process gain does absolutely nothing towards better error rates. However, in a real channel (with interference, fading, etc.) process gain does help mitigate some of the effects and therefore does help the error rate as compared to a non-spread system. Coding gain is obtained from adding redundancy to the message sent.

>Just wondering, the SETI thread has made me think about it.

Sounds interesting. Looking at how communication system have evolved over the past few decades makes me wonder how we expect to receive whatever type of modulation the ETIs decide to send!

Jeff, k9ja

P.S. I'm currently not on HFSIG and will not see followups to this message from that group.

---  
Jeffrey Austen | Tennessee Technological University  
jra1854@tnitech.edu | Box 5004  
+1 615 372 3485 | Cookeville Tennessee 38505 U.S.A.

---

## 129. SS IF bandwidth

From: N5RG@aol.com  
Date: Fri, 23 May 1997 12:37:25 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <970523123721\_909984250@emout11.mail.aol.com>  
Rendered body type: text/plain

SS Experts:

I have been trying to understand how a spread spectrum signal is received.  
I have been wondering what is the best kind of IF amplifier for SS.

For example, assume that a data bit was sent by spreading it such that it was sent at 8 different frequencies over the length of time required to send that bit. It seems to me if a receiver were tuned to one of these frequencies that it would see a pulse appearing at random intervals. The optimum IF response would be a pulse amplifier tuned such that it matched the characteristics of the pulse. The bandwidth would have to be wide to allow the pulse to pass through.

But in a SS receiver the frequency the receiver is tuned to hops around to follow the transmitted frequency. In this case, it seems to me that a narrow IF bandwidth could be used if the signal coming to the IF was phase coherent so that the ringing in the IF amplifier filters would continue to be reinforced by the signal feeding it. It also seem to me to be quite a trick to keep the signal feeding the IF phase coherent as the frequency hops around.

Most likely the SS receiver does not work the way I have invisioned above but works in some manner I have not thought of.

If so, how does it work?

73, Roy W7IDM, ex N5RG

---

## 130. Is SS The Solution For High Speed Packet Networks?

From: Marty Albert <marty@trucom.com>  
Date: Sun, 25 May 1997 22:18:35 -0500  
To: bbssig@tapr.org, netsig@tapr.org, ss@tapr.org  
Message-ID: <1.5.4.32.19970526031835.006744b0@mail.trucom.com>  
Rendered body type: text/plain

Hello, Folks:

I have a feeling that I may catch a lot of flames for this one from the SS crowd, but...

I've done a lot of reading and testing the past year or so and was wondering if I am the only person who does not see Spread Spectrum (SS hereafter) to be the answer for high speed, high bandwidth packet networks.

Now, don't get me wrong... I fully support the continued experiments with SS that may lead to something valuable, but I am talking about real world, here and now applications.

After doing a lot of research, it has become clear to me that SS suffers from several major problems for practical use in a large network...

(1) There are no fully documented systems using SS that are cost effective that I have found.

(2) Most of the SS systems I have looked at require a lot of tweaking to get them to work, often meaning a near re-engineering of the system for each link.

(3) None of the real experts doing SS development (I am not one of them!) seem to be willing to develop a simple, reproducible SS system that can be used right now.

Based on what I have actually seen of packet networks and on what I have read other people say about their local networks, I think that most high speed packet networks fall into one of the following classes:

(A) There ain't one.

(B) The network is broken to some extent or another, often due to lack of repairs and/or updates.

(C) The network is 10 or more years out of date, still relying on old, slow links (sometimes 9600 bps, often 1200 bps).

So, what we really need is a "Plug And Play" network solution. SS does not, at this time, offer such ease of set up and operation. It may at some point in the future, but not now.

There are several options out there now, but one of the best that I have seen in terms of documentation and the ability to be reproduced is the system being used in Slovenia. (see <http://lois.kud-fp.si/hamradio/packet.html> for more information)

The Slovenian network uses high speed radio modems to allow speeds up to 1.2 Mbps. All of the schematics, PCB layouts, etc. are fully available. The fine folks there that are involved with the project are also very willing to help and answer questions.

It is worth noting that the Slovenian system uses simple techniques that are both time tested and understandable by, I suspect, most Hams.

Again, don't get the wrong idea here... I am not saying that the Slovenian system is better than SS, just that it is much easier to impliment and it is available now. A pair of 1.2 Mbps Slovenian style radio modems can be built in less than a week for less than \$100.00. My experiements with SS took 6 weeks and nearly \$200.00 to get working and they were still not right and only 56 Kbps.

I would encourage those doing SS development to continue to do so, but to perhaps shift the focus to real world applications. We need clear, reproducible designs that are simple to build, install, set up and operate.

And, perhaps even more important in the packet world where \$\$\$ are hard to come by, we also need something that is inexpensive.

So, in closing, those interested in packet networking should take a close look at the Slovenian system (URL above) before jumping on the SS bandwagon.

It just seems that I am the only person out there who is not in love with SS as the solution for high speed packet.

Take Care & 73

Marty Albert - [marty@trucom.com](mailto:marty@trucom.com)  
Amateur Radio: KC6UFM@KC6UFM.#SEMO.MO.USA.NOAM

\*\*\*\*\*  
Interested in Amateur Radio?  
<http://www.trucom.com/ppages/marty>  
\*\*\*\*\*  
HAMPS Coordinator  
<http://www.geocities.com/CapeCanaveral/Lab/7067>  
\*\*\*\*\*

---

### 131. Re: [SS:1462] Is SS The Solution For High Speed Packet Networks?

From: "Dale Heatherington" <[wa4dsy@wa4dsy.radio.org](mailto:wa4dsy@wa4dsy.radio.org)>  
Date: Mon, 26 May 97 12:05:00  
To: "ss@tapr.org" <[ss@tapr.org](mailto:ss@tapr.org)>  
Message-ID: <199705261605.QAA464333@out1.ibm.net>  
Rendered body type: text/plain

On Sun, 25 May 1997 22:22:59 -0500 (CDT), Marty Albert wrote:

>Again, don't get the wrong idea here... I am not saying that the Slovenian  
>system is better than SS, just that it is much easier to impliment and it is  
>available now. A pair of 1.2 Mbps Slovenian style radio modems can be built  
>in less than a week for less than \$100.00. My experiements with SS took 6  
>weeks and nearly \$200.00 to get working and they were still not right and  
>only 56 Kbps.

At the risk of describing commonly known facts and getting  
off the topic of SS I'll add my 2 cents worth.

Lets not forget the WA4DSY 56KB modems which are



available assembled and tested. You need only add a transverter (Downeast Microwave) and a PI2 card (Ottawa). This is plug and play. Although it isn't as fast as the Slovenian system it only takes 100khz channels. A bit regenerator is built in for easy implementation of computerless full duplex mtn. top repeaters (we have 2 in Atlanta).

A forward error correction EPROM is available.

This email and all access to my web server pass through 5 modems on the way to/from the ISP over a 35 mile path (includes 2 bit repeaters, 222 mhz and 440mhz). I can hit the ISP via one bit repeater but I use both to keep tabs on the systems operation. This system is rock solid and trouble free. I suppose I should publish something on the implimentation of this system...

There is an external TX clock input to allow connecting two modems back to back which enables linking 2 or more FDX bit repeaters without a computer. One of the Atlanta sites is configured this way. It has a 440/445 mhz FDX bit repeater linked to a 222/223 mhz simplex 56k modem/transverter configured to talk to the other mtn top FDX bit repeater. In short, they work as a single FDX bit repeater with access from either the 440 band or 222 band.

During the past 23 days the web server reports it has sent 135 megabytes in 12,732 transactions. The OS/2 PI card driver reports 774,800 TX frames and 695,175 RX frames during this time.

Now, back the the normal SS topics.

-----  
Dale Heatherington, WA4DSY  
e-mail - daheath@ibm.net  
Web page - <http://www.wa4dsy.radio.org>  
OS/2 Warp 4.0 The worlds finest desktop OS.

---

## 132. Re: [SS:1462] Is SS The Solution For High Speed Packet Networks?

From: N5RG@aol.com  
Date: Mon, 26 May 1997 12:14:43 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <970526121441\_587598288@emout12.mail.aol.com>  
Rendered body type: text/plain

Marty:

I have been hearing about SS for several years now and have been trying to understand how it works. I have learned that it does have some very marvelous properties and has some important benefits. But not without complications such as the requirement for extremely accurate clocks. Some organizations such as the U.S. Army consider the benefits worth the considerable expense of solving the complications and can raise the money to pay for the required solutions.

>From what I have seem, Amateur Radio is a different kind of operation. For something to be successful it has to be either very inexpensive or offer some very great benefit. Perhaps the last great change in the way of doing things happened in the 1960's when Hams converted from AM to SSB. It seems to me that one reason this worked was that Hams like to talk and SSB helped them talk better while at the same time producing smaller radios by getting rid of those big heavy modulation transformers.

The next great innovation was the FM repeater. This was largely made possible by the availability of cheap surplus commercial radios. If it had been necessary for Hams to develop their own FM radios from scratch, the FM revolution would have taken a lot longer or perhaps never happened.

Packet Radio seems to be kind of a fringe operation in Amateur Radio. Quite a few Hams have given it a try as an alternative to talking. And a few have have made packet their primary interest. But talking still seems to be the most popular use of Amateur Radio.

Perhaps digital radio will not really take off until it is used as the basis of a network used for talking. This would have the benefit of making the network useful for all kinds of things besides talking such as exchanging pictures to explain what we are talking about, etc, etc. Then we would really be getting someplace!

I am not sure what the best way to achieve such a network is. Should it be based upon narrowband high speed data channels such as those beginning to be used for the new Digital Television system (scheduled to replace the current analog system by 2006), or should it be based upon digital cellular telephones using spread spectrum techniques that have been converted to operate in the Ham bands? Or what???

73, Roy W7IDM, ex N5RG, W5PAG

---

### 133. Re:[SS:1462] Is SS The Solution For High Speed Packet Networks?

From: Don Lemke <wb9mjin@wb9mjin.ampr.org>  
Date: Mon, 26 May 1997 14:47:14 -0500  
To: ss@tapr.org  
Message-ID: <3389E8C1.5F38@wb9mjin.ampr.org>  
Rendered body type: text/plain

Hi Marty,

At first, I thought allot the way u do. I was thinking along the lines of the Slovenian radios, but on 3.3 Ghz, and 2 MB. I was thinking about doing Differential PSK. Its quick and dirty. The demodulation uses a mixer in a similar fashion to a Quadrature FM detector. But instead of a 90 degree phase shift, it uses a 1 bit delay line.

There s a problem with the Slovenian radios for USA application. The modulation quality would not be legal in the US, I believe. Also, a 1.2 MB PSK signal is as wide as one of the two 1.2 Ghz data allocations. So, that would leave only two channels, or 1 full duplex channel. Unless we ignored weak signal, FM and ATV allocations. I imagine the Slovenians are taking the view that 1.2 Ghz is useless for these applications, for the average Slovenian ham. And have carved up the band for Digital so that the average ham gets great advantage from the band while not being directly on it. A great thing to do, but a good way to start a turf war in the USA.

The Slovenian radios have allot of good points too. They are cheap. There s no need for double conversion Transverter, as with the WA4DSY modem (which is a clearly superior modulation), and thus allot of RF expense is cut out of the total package.

Then the Internet explosion happened. 1.2 Mb links are great, but it was not going to do , if the drop into somebodys QTH was still only 56 KB, and 6 or 700 bucks. I even had problem here, out of my apartment, with 9600 baud and delay spread effects of Multipath. Delay spread is the big problem. I was shocked when i realised that i was seeing packets lost due to delay spread, at a mere 9600 baud. I solved the problem with a unidirectional antenna. But even so, it points out what is going to be an even bigger problem at megabaud rates. A Metropolitan network will need megabaud into the home qth, to be viable. Even if the average thrupt required is 100 s of KB, the need for high burst rates for all those fun applications, is going to be there. Direct Sequence Spread Spectrum with digital matched filter is a great tool for solving this problem.

DSSS with the digital matched filter (DMF) can lock up in one symbol time. The extra bandwidth of the signal allows for this, while still limiting the noise bandwidth to that of the information bandwidth. But, right now there s not enuf processing gain, available cheap. What is available cheap is 18 dB processing gain (STEL2000a). Its safe to have more than this, say something like 25 dB, to keep equal amplitude secondary path signals down out of the modem capture range, in the home qth application. Unidirectional antennas can easily provide an extra 13 dB of multipath rejection.

Many of the other issues u bring up are RF networking enviornment issues. They are best handled by a new way of doing the MAN (metropolitan area network). We now have organisations that build cellular style networks. If a link goes down, technical people from the organisation have to go fix it. I think this is great stuff, but its the wrong way to do things, now. First off, the link gear is too low a level of production to be economic. Even if it is excruciatingly cheap compared to professional gear doing the same job. The cost of the link gear is either in time to make it, or money to buy it (if its plug and play). Either way, there are not many spares, usually. This results in an unreliable network.

With the Internet explosion, users have higher expectations. 33.6, or 56 KB at least. To get such thrupt, the RF network raw data

rate has to be allot more, and the more hops out from an internet gateway, the more the data rate has to be. While, it would be easy to make a 56 KB access packet network , in the pattern we have now, the goal is to have 10 s of people in a metropolitan area with that level of thrupt. Even a successful club would have a hard time keeping such a network on-air , even if they could afford to put it in.

Allot of political packet people say we need to get money out of the users. That s simpler said than done. If we had the \$20 /month from people, that ISP s get, things would be easier. But, lets face it, that is not going to happen. ISP s will get that money, more readily, than we, because they have the familiar, reliable, user funded Telephone company gaurunteeing connectivity.

The DDMA/WAN (directivity division multiple access/wide area network) (also known as the "Flying Saucer Net") addresses this. Its a DSSS/DMF radio, and an azimuthal scanning antenna. The antenna scans looking for RTS (Request to Send) 'ing stations, and then answers those. A packet comes in, it goes up to the level three, and then back out to the radio with a direction towards the next network partner in-line towards the destination. Each user, if he wants in on this, buys and installs his own radio. The local organisation priorities are shifted to education, applications and support, rather than network building and maintenance. The manpower available at local ham clubs can readily do the education and support jobs, typically. Its tuff to get people to do the network building and maintenance, as well as sites that can be accessed by the technical people without the primary site representative. Allot of stuff doesn t get done, because one guy can t make it, even if two or three are available. Opportunistic situations are also eliminated. Which is deadly to an volunteer workforce getting anything done.

With DDMA/WAN thrupt is maximised in the time-bandwidth-area resource, by tight directive beams, and sending packets to the closest neighbor towards the destination, with minimun power to do that link level hop. This minimises area used, per transmission, and also minimises the number non-participating stations overlapped by that area-time-bandwidth being used.

With this system, participants are paying for what they use, thru the radio gear. There s enuf production level on the link/user gear to be viable, since they are one in the same. Reliability is enhanced, because megabaud link is at every user location, and rerouting becomes readily doable. Its economic, because one does not need a point to point antenna, and seperate feedline for each neighbor (thanks to the scanning antenna technology). The delay spread problem is dealt with by the directional antenna, as best as can be done. Kinda look at this way, If we have to use directional antenna to do high data rates, then we need to make the directional antenna the network. The azimuthal scan antenna is the economic result of making the directional antenna the network. The DSSS/DMF radio is the result of the need for fast lock-up. As a network changes, one does not need a new antenna for a new direction. Just a new bearing to command the antenna to.

A network of this type can start with two guys who want to do something like CUSEME, teleconferencing. And grow as others like what they see, and put on their own stations. No need for in-depth planning, other than for the individuals to judge if they will be in range. Versus the cellular model, which needs a sizable group of people to support the high cost central site.

I see SS as a neccassary tool for High Speed Packet networking. I came to this opinion, thru experience, and the discussions that led to the DDMA/WAN concept. Originally, the only value I saw to SS, was that a DSSS/DMF off the shelf chip, could lock up in one symbol time, with out any noise bandwidth increase. This is neet, of itself, but not all that needed, until u try to do a home based megabaud network. U know, ATT Long Lines ran multimegabaud microwave links, with out any SS, for years and years. But they did have the advantage of megabuck sites and antennas. The radio technology to do this has become quite cheap in this past decade. But, the physics of the microwave path remains the same. SS is probably the only way to get the megabaud into the home qth that is not on mounted on a tower, on the best high ground around.

So, I guess, the question is not really one of SS for High Speed data or not, but do u want to do ur network the way they have been in the past, or to do it by something resembling the DDMA-WAN way? Where

the network is grown, rather than built. I personally cannot see the way things have been done, even in places where that way has been successful, continuing for a long time. The Internet's popularity changes it all. If we continue building ATT style links, and drops, without any way of funding it, we will loose out to people doing that, with funding. If we build DDMA-WAN radio/antenna , we have a chance of growing networks that will be omni-useful to all hams, and supported and installed by all hams. Just as the any ham would throw on a SSB HF station, now.

--

73, Don.

AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]  
Internet: wb9mjn@wb9mjn.ampr.org@uugate.aim.utah.edu  
Finger: wb9mjn@wb9mjn.ampr.org

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### 134. [from UO-22] Spread Spectrum QRM?

From: "Steven R. Bible" <sr bible@gate.net>  
Date: Mon, 26 May 1997 17:42:56 -0400  
To: ss@tapr.org  
Message-ID: <3.0.1.32.19970526174256.006946f0@pop.gate.net>  
Rendered body type: text/plain

I picked this off of UO-22 this morning (Monday, May 26, 1997).

- Steve, N7HPR

-----[UO-22:60811]-----

From: GB7LAN  
To: ALL SATGAT  
Subject: SATGEN 426 Spread Spectrum QRM  
Keywords: AMSAT SATGEN

-----  
SB AMSAT @ AMSAT < GM4IHJ \$SGEN426  
Satgen426 Spread Spectrum QRM  
R:970523/0548 @:GB7SAN.#78.GBR.EU

Satgen426 Spread Spectrum QRM ? by GM4IHJ (BID SGEN426) 24 May 97

There are two basic ways to modulate a radio signal with information. You can use narrow band modulation as with systems like SSB, PSK and even FM. Restricting the signal to a relatively narrow band of frequencies but using a lot of power in the narrow sidebands. Or you can spread the signal out thinly like jam in a sandwich, covering 500 KHz or more of bandwidth but spreading out the power distribution so that the power in each few KHz is ( or should be ) very low.

Spread Spectrum modulation of signals has been around for a very long time, but the arrival of digital systems has suddenly given it much greater prominence. It is being proposed in some quarters for amateur radio use, and it has already appeared in several military systems and is being canvassed for many forthcoming commercial systems. Not least amongst its "qualities" , is the suggestion that it can easily share with (overlay), existing systems of modulation without ill effect to them or itself. Is this true ? Recent experience suggests it is not.

One of the earliest examples of the worldwide use of spread spectrum occurred in the late 1970s and early 1980s, when the Soviets were conducting Killer satellite tests. Far from being covert, the signals were very obvious. Stretching over 500 KHz of bandwidth in the radio amateur 2m band they produced a forest of carriers roughly 1.5 KHz apart dopplering across the band at considerable signal strength at any receiver in the satellites footprint. They were a nuisance but they never became frequent enough to constitute a major problem.

Unfortunately modern spread spectrum systems introduced unannounced, are already apparently going a long way towards ruining the 70 cm amateur band and its adjacent spectrum over the British Isles. The signals appear to come from the masts of the high power UHF stations which radiate the 5 channels of the UK terrestrial television service. But the signals are clearly not a product or cross modulation artifact of the TV signals. They appear to be totally separate military or government traffic.

As seen on a spectrum analyser 14 kms from one of the TV masts, the noise level background appears to rise +10dB over a band of

frequencies which stretches all across 430 to 440 MHz and some way beyond at either end. The signals are apparently being radiated from several widely separated TV masts in various parts of the UK, and they are destroying radio amateur low signal strength experimental work such as Moonbounce, Mars vehicle tracking, Sporadic E, Meteor Scatter, FAI and Auroral studies, over a wide arc of bearing. Transmission power appears to be several Kilowatts and the signals seems to be data with pseudo random noise modulation. This British experience is salutary. Clearly "Sharing" bands with authorities who operate in this way is an impossibility. The Spread spectrum takes over the whole band, blatantly ignoring other band users. A situation which becomes highly significant in view of the recent suggestions that radio amateurs accept sharing with spread spectrum users on several of their bands, as presently being discussed by at least one national authority. 73 de GM4IHJ@GB7SAN or gm4ihj@branegan.demon.co.uk  
+

/EX

---

### 135. Re: [SS:1462] Is SS The Solution For High Speed Packet Networks?

From: Jerry Normandin <jerryn@ici.net>  
Date: Mon, 26 May 1997 21:52:15 -0400  
To: ss@tapr.org  
Message-ID: <338A3E4F.12A8232C@ici.net>  
Rendered body type: text/plain

Jerry Normandin replies:

I am very interested in the slovan approach... can you forward me the schmatics or a URL? That costs less then a Wavelan card that's for sure! What protocol do you run? AX.25??

Marty Albert wrote:

>  
> Hello, Folks:  
>  
> I have a feeling that I may catch a lot of flames for this one from the SS  
> crowd, but...  
>  
> I've done a lot of reading and testing the past year or so and was wondering  
> if I am the only person who does not see Spread Spectrum (SS hereafter) to  
> be the answer for high speed, high bandwidth packet networks.  
>  
> Now, don't get me wrong... I fully support the continued experiments with SS  
> that may lead to something valuable, but I am talking about real world, here  
> and now applications.  
>  
> After doing a lot of research, it has become clear to me that SS suffers  
> from several major problems for practical use in a large network...  
>  
> (1) There are no fully documented systems using SS that are cost effective  
> that I have found.  
>  
> (2) Most of the SS systems I have looked at require a lot of tweaking to get  
> them to work, often meaning a near re-engineering of the system for each link.  
>  
> (3) None of the real experts doing SS development (I am not one of them!)  
> seem to be willing to develop a simple, reproducible SS system that can be  
> used right now.  
>  
> Based on what I have actually seen of packet networks and on what I have  
> read other people say about their local networks, I think that most high  
> speed packet networks fall into one of the following classes:  
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> (A) There ain't one.  
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> (B) The network is broken to some extent or another, often due to lack of  
> repairs and/or updates.  
>  
> (C) The network is 10 or more years out of date, still relying on old, slow  
> links (sometimes 9600 bps, often 1200 bps).  
>  
> So, what we really need is a "Plug And Play" network solution. SS does not,  
> at this time, offer such ease of set up and operation. It may at some point

> in the future, but not now.  
>  
> There are several options out there now, but one of the best that I have  
> seen in terms of documentation and the ability to be reproduced is the  
> system being used in Slovenia. (see  
> <http://lois.kud-fp.si/hamradio/packet.html> for more information)  
>  
> The Slovenian network uses high speed radio modems to allow speeds up to 1.2  
> Mbps. All of the shematics, PCB layouts, etc. are fully available. The fine  
> folks there that are involved with the project are also very willing to help  
> and answer questions.  
>  
> It is worth noting that the Slovenian system uses simple techniques that are  
> both time tested and understandable by, I suspect, most Hams.  
>  
> Again, don't get the wrong idea here... I am not saying that the Slovenian  
> system is better than SS, just that it is much easier to impliment and it is  
> available now. A pair of 1.2 Mbps Slovenian style radio modems can be built  
> in less than a week for less than \$100.00. My experiements with SS took 6  
> weeks and nearly \$200.00 to get working and they were still not right and  
> only 56 Kbps.  
>  
> I would encourage those doing SS development to continue to do so, but to  
> perhaps shift the focus to real world applications. We need clear,  
> reproducible designs that are simple to build, install, set up and operate.  
>  
> And, perhaps even more important in the packet world where \$\$\$ are hard to  
> come by, we also need something that is inexpensive.  
>  
> So, in closing, those interested in packet networking should take a close  
> look at the Slovenian system (URL above) before jumping on the SS bandwagon.  
>  
> It just seems that I am the only person out there who is not in love with SS  
> as the solution for high speed packet.  
>  
> Take Care & 73  
>  
> Marty Albert - [marty@trucom.com](mailto:marty@trucom.com)  
> Amateur Radio: KC6UFM#KC6UFM.#SEM0.MO.USA.NOAM  
>  
> \*\*\*\*\*  
> Interested in Amateur Radio?  
> <http://www.trucom.com/ppages/marty>  
> \*\*\*\*\*  
> HAmPS Coordinator  
> <http://www.geocities.com/CapeCanaveral/Lab/7067>  
> \*\*\*\*\*

### 136. Re: [SS:1467] Re: Is SS The Solution For High Speed Packet Networks?

From: "Greg Jones, WD5IVD" <[wd5ivd@tapr.org](mailto:wd5ivd@tapr.org)>  
Date: Mon, 26 May 1997 21:50:13 -0500  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <[v03020904afaff8c3d488@208.134.134.40](mailto:v03020904afaff8c3d488@208.134.134.40)>  
Rendered body type: text/plain

>Jerry Normandin replies:  
>  
>I am very interested in the sloviaan approach... can you forward me the  
>schmatics or  
>a URL? That costs less then a Wavelan card that's for sure!  
>What protocol do you run? AX.25??  
>

It was all published in the last ARRL/TAPR 15th Digital Communications  
Conference. Matjaz Vidmar, S53MV, published two papers this last year.  
Lyle Johnson was responsible for getting Matjaz to get publish his work.

See: <http://www.tapr.org/tapr/html/cnc15.html>

13cm PSK Transceiver for 1.2Mbit/s Packet Radio  
by Matjaz Vidmar, S53MV  
Abstract: This paper describes the design of a 13cm 1.2Mbit/s PSK  
transceiver for packet radio by Matjaz Vidmar, S53MV. Includes: schematics,  
layout, figures, and experimental results.

23cm PSK packet-radio RTX for 1.2Mbit/s user access  
by Matjaz Vidmar, S53MV  
Abstract: This paper describes the design of a 23cm 1.2Mbit/s user access

RTX by Matjaz Vidmar, S53MV. Includes: schematics, layout, figures, and experimental results.

As I tell people each year -- if you can't attend the DCC each year you should at least get a copy of the proceedings. I am always going back and referring to papers published in the past. If you can attend -- the DCC is a lot of fun and there is always a lot to discuss in the way of new approaches by people.

The 1997 DCC is in Baltimore in Oct. <http://www.tapr.org/dcc>

Cheers - Greg

P.S. Anyone interested in digital communications is invited to submit a paper for publication in the Conference Proceedings. Presentation at the Conference is not required for publication. If you know of someone who is doing great things with digital communications, be sure to personally tell them about this!

Papers are due by \*\* August 20th, 1997 \*\*, and should be submitted to Maty Weinberg, ARRL, 225 Main Street, Newington, CT 06111 or via the Internet to [lweinberg@arrl.org](mailto:lweinberg@arrl.org). Information on paper submission guidelines are available on-line.

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Greg Jones, WD5IVD  
Austin, Texas  
[wd5ivd@tapr.org](mailto:wd5ivd@tapr.org)  
<http://www.tapr.org/~wd5ivd>  
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### 137. Re: [SS:1464] Re: Is SS The Solution For High Speed Packet Networks?

From: Marty Albert <[marty@trucom.com](mailto:marty@trucom.com)>  
Date: Mon, 26 May 1997 22:05:40 -0500  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <1.5.4.32.19970527030540.00681444@mail.trucom.com>  
Rendered body type: text/plain

At 11:19 05/26/97 -0500, Roy W7IDM wrote:

>Marty:

>

>I have been hearing about SS for several years now and have been trying  
>to understand how it works. I have learned that it does have some very  
>marvelous properties and has some important benefits. But not without  
>complications such as the requirement for extremely accurate clocks.  
>Some organizations such as the U.S. Army consider the benefits worth  
>the considerable expense of solving the complications and can raise the  
>money to pay for the required solutions.

SS does some great things now and has the potential, I believe, to do even more in the future. That is one small part of the problem, as I see it... We need solutions NOW.

At this time, we keep hearing little "tid bits" about various projects that people are working on, some sound good, some not (nothing unusual there). But, getting information on how to actually use these ideas in real world applications is slow to come. What information there is needs someone with the knowledge to re-engineer the system and the \$\$\$ for the seemingly big money that SS takes.

>From what I have seem, Amateur Radio is a different kind of operation.  
>For something to be successful it has to be either very inexpensive or offer  
>some very great benefit.

<snip>

I'm not sure that inexpensive and great benefits are mutually exclusive... After all, as in your examples, SSB and FM both offer benefits over plain vanilla AM, but they are both less expensive to impliment.

One could argue that this was not true back in the early days of SSB and FM (frankly, I don't know... I wasn't there) but SS has been used in the military and commercial markets for a long time now. Costs should be down on specialized devices to some extent.

>Packet Radio seems to be kind of a fringe operation in Amateur Radio.  
>Quite a few Hams have given it a try as an alternative to talking. And a few  
>have made packet their primary interest. But talking still seems to be  
>the most popular use of Amateur Radio.  
>  
>Perhaps digital radio will not really take off until it is used as the basis  
>of a network used for talking. This would have the benefit of making the  
>network useful for all kinds of things besides talking such as exchanging  
>pictures to explain what we are talking about, etc, etc. Then we would  
>really be getting someplace!

You may have hit upon something here, Roy... I have never thought about it  
from this particular angle...

Given enough bandwidth, digital voice is no problem... Even at 56 Kbps it is  
possible (the quality is not too great, but it's not all that bad). This  
needs some more thought time!

>I am not sure what the best way to achieve such a network is. Should it  
>be based upon narrowband high speed data channels such as those beginning  
>to be used for the new Digital Television system (scheduled to replace  
>the current analog system by 2006), or should it be based upon digital  
>cellular telephones using spread spectrum techniques that have been  
>converted to operate in the Ham bands? Or what???

That is my question, too... Each has some interesting possibilities,  
advantages, and disadvantages...

Narrowband imposes limits on throughput. In fact, your throughput is a  
function of bandwidth, so this is universal.

SS holds a lot of promise, but we need something now.

Wideband can be done now and done cheap. There are a few legal issues to  
look at in some bands as well as bandplan issues that would need to be  
addressed.

>73, Roy W7IDM, ex N5RG, W5PAG

Take Care & 73

Marty Albert - [marty@trucom.com](mailto:marty@trucom.com)  
Amateur Radio: KC6UFM@KC6UFM.#SEMO.MO.USA.NOAM

\*\*\*\*\*  
Interested in Amateur Radio?  
<http://www.trucom.com/ppages/marty>  
\*\*\*\*\*  
HAMPS Coordinator  
<http://www.geocities.com/CapeCanaveral/Lab/7067>  
\*\*\*\*\*

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## 138. Re: [SS:1467] Re: Is SS The Solution For High Speed Packet Networks?

From: Marty Albert <[marty@trucom.com](mailto:marty@trucom.com)>  
Date: Mon, 26 May 1997 22:28:18 -0500  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <1.5.4.32.19970527032818.0068637c@mail.trucom.com>  
Rendered body type: text/plain

At 21:01 05/26/97 -0500, you wrote:

>Jerry Normandin replies:

>  
>  
>  
>  
>

>I am very interested in the slovan approach... can you forward me the  
>schematics or  
>a URL? That costs less then a Wavelan card that's for sure!  
>What protocol do you run? AX.25??  
>

<http://lois.kud-fp.si/hamradio/packet.html> for more information)

The testing that I am doing is using JNOS with normal AX.25



Note that much of the Slovenian system can't legally be used full time in the US due to the bandwidth. (the 70cm WBFM for example)

Take Care & 73

Marty Albert - marty@trucom.com  
Amateur Radio: KC6UFM@KC6UFM.#SEMO.MO.USA.NOAM

\*\*\*\*\*  
Interested in Amateur Radio?  
<http://www.trucom.com/ppages/marty>  
\*\*\*\*\*  
HAMPS Coordinator  
<http://www.geocities.com/CapeCanaveral/Lab/7067>  
\*\*\*\*\*

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### 139. Re: [SS:1465] Re:Is SS The Solution For High Speed Packet Networks?

From: Marty Albert <marty@trucom.com>  
Date: Mon, 26 May 1997 22:28:14 -0500  
To: ss@tapr.org  
Message-ID: <1.5.4.32.19970527032814.00691b00@mail.trucom.com>  
Rendered body type: text/plain

At 14:59 05/26/97 -0500, Don WB9MJN wrote:

>Hi Marty,  
>

> At first, I thought allot the way u do. I was thinking along the  
>lines of the Slovenian radios, but on 3.3 Ghz, and 2 MB. I was thinking  
>about doing Differential PSK. Its quick and dirty. The demodulation uses  
>a mixer in a similar fashion to a Quadrature FM detector. But instead of  
>a 90 degree phase shift, it uses a 1 bit delay line.

Actually, I ran the other way... For a long time, I was on the SS bandwagon,  
but have decided that SS may not be the way to go from a practical standpoint.

> There s a problem with the Slovenian radios for USA application.  
>The modulation quality would not be legal in the US, I believe.

I too had some concerns til I put the spectrum analyzer on one of the  
units... Actually looks pretty good!

>Also, a  
>1.2 MB PSK signal is as wide as one of the two 1.2 Ghz data allocations.  
>So, that would leave only two channels, or 1 full duplex channel. Unless  
>we ignored weak signal, FM and ATV allocations. I imagine the Slovenians  
>are taking the view that 1.2 Ghz is useless for these applications, for  
>the average Slovenian ham. And have carved up the band for Digital so  
>that the average ham gets great advantage from the band while not being  
>directly on it. A great thing to do, but a good way to start a turf war  
>in the USA.

Possibly... The use of 23cm seems to very geographical. Around here, the  
nearest 23cm radio is over 100 miles away! Where I lived in CA, there were  
almost as many folks on 23cm as on 2m. Go figure.

> The Slovenian radios have allot of good points too. They are  
>cheap. There s no need for double conversion Transverter, as with the  
>WA4DSY modem (which is a clearly superior modulation), and thus allot of  
>RF expense is cut out of the total package.

The WA4DSY is a great system, although limited to 56 Kbps and outrageously  
priced. (I have seen the older "GRAPES" versions modified for a little more  
than 256 Kbps) The big problem I see with the WA4DSY system is the price...  
You're looking at nearly \$1,000.00 per station to get the thing on the air.  
Frankly, that is ridiculous.

> Then the Internet explosion happened. 1.2 Mb links are great, but  
>it was not going to do , if the drop into somebodies QTH was still only  
>56 KB, and 6 or 700 bucks. I even had problem here, out of my apartment,  
>with 9600 baud and delay spread effects of Multipath. Delay spread is  
>the big problem. I was shocked when i realised that i was seeing packets  
>lost due to delay spread, at a mere 9600 baud. I solved the problem with  
>a unidirectional antenna. But even so, it points out what is going to be  
>an even bigger problem at megabaud rates. A Metropolitan network will

>need megabaud into the home qth, to be viable. Even if the average  
>thruput required is 100 s of KB, the need for high burst rates for all  
>those fun applications, is going to be there. Direct Sequence Spread  
>Spectrum with digital matched filter is a great tool for solving this  
>problem.

I agree... SS does potentially offer a solution. But we need inexpensive,  
reproducible information made widely available. Without that, all the  
wonderful theory and research will just gather dust.

> DSSS with the digital matched filter (DMF) can lock up in one  
>symbol time. The extra bandwidth of the signal allows for this, while  
>still limiting the noise bandwidth to that of the information bandwidth.  
>But, right now there s not enuf processing gain, available cheap. What  
>is available cheap is 18 dB processing gain (STEL2000a). Its safe to  
>have more than this, say something like 25 dB, to keep equal amplitude  
>secondary path signals down out of the modem capture range, in the home  
>qth application. Unidirectional antennas can easily provide an extra 13  
>dB of multipath rejection.

Are there any plans or details available for such a system that is ready to  
go on the air?

> Many of the other issues u bring up are RF networking enviornment  
>issues. They are best handled by a new way of doing the MAN  
>(metropolitan area network). We now have organisations that build  
>cellular style networks. If a link goes down, technical people from the  
>organisation have to go fix it. I think this is great stuff, but its the  
>wrong way to do things, now. First off, the link gear is too low a level  
>of production to be economic. Even if it is excruciatingly cheap  
>compared to professional gear doing the same job. The cost of the link  
>gear is either in time to make it, or money to buy it (if its plug and  
>play). Either way, there are not many spares, usually. This results in  
>an unreliable network.

>  
> With the Internet explosion, users have higher expectations.  
>33.6, or 56 KB at least. To get such thruput, the RF network raw data  
>rate has to be alot more, and the more hops out from an internet  
>gateway, the more the data rate has to be. While, it would be easy to  
>make a 56 KB access packet network , in the pattern we have now, the  
>goal is to have 10 s of people in a metropolitan area with that level of  
>thruput. Even a successful club would have a hard time keeping such a  
>network on-air , even if they could afford to put it in.

>  
> Allot of political packet people say we need to get money out of  
>the users. That s simpler said than done. If we had the \$20 /month from  
>people, that ISP s get, things would be easier. But, lets face it, that  
>is not going to happen. ISP s will get that money, more readily, than  
>we, because they have the familiar, reliable, user funded Telephone  
>company gaurunteeing connectivity.

Not sure if comparing packet to the Internet is either valid or fair... Most  
packet users I know have totally different expectations for packet than they  
do for their Internet connection. A couple of the reasonable complaints that  
packet users do have are:

Why should it take a week or more to get a message across country?

Why should it take 3 hours to download a 50K file?

> The DDMA/WAN (directivity division multiple access/wide area  
>network) (also known as the "Flying Saucer Net") addresses this. Its a  
>DSSS/DMF radio, and an azimuthal scanning antenna. The antenna scans  
>looking for RTS (Request to Send) 'ing stations, and then answers those.  
>A packet comes in, it goes up to the level three, and then back out to  
>the radio with a direction towards the next network partner in-line  
>towards the destination. Each user, if he wants in on this, buys and  
>installs his own radio. The local organisation priorities are shifted to  
>education, applications and support, rather than network building and  
>maintenance. The manpower available at local ham clubs can readily do  
>the education and support jobs, typically. Its tuff to get people to do  
>the network building and maintenance, as well as sites that can be  
>accessed by the technical people without the primary site  
>representative. Allot of stuff doesn t get done, because one guy can t  
>make it, even if two or three are available. Opportunistic situations are  
>also eliminated. Which is deadly to an volunteer workforce getting

>anything done.

>

> With DDMA/WAN thuput is maximised in the time-bandwidth-area  
>resource, by tight directive beams, and sending packets to the closest  
>neighbor towards the destination, with minimum power to do that link  
>level hop. This minimises area used, per transmission, and also  
>minimises the number non-participating stations overlapped by that  
>area-time-bandwidth being used.

>

> With this system, participants are paying for what they use,  
>thru the radio gear. There's enough production level on the link/user gear  
>to be viable, since they are one in the same. Reliability is enhanced,  
>because megabaud link is at every user location, and rerouting becomes  
>readily doable. It's economic, because one does not need a point to point  
>antenna, and separate feedline for each neighbor (thanks to the scanning  
>antenna technology). The delay spread problem is dealt with by the  
>directional antenna, as best as can be done. Kinda look at this way, If  
>we have to use directional antenna to do high data rates, then we need  
>to make the directional antenna the network. The azimuthal scan antenna  
>is the economic result of making the directional antenna the network.  
>The DSSS/DMF radio is the result of the need for fast lock-up. As a  
>network changes, one does not need a new antenna for a new direction.  
>Just a new bearing to command the antenna to.

>

>

> A network of this type can start with two guys who want to do  
>something like CUSEEME, teleconferencing. And grow as others like what  
>they see, and put on their own stations. No need for in-depth planning,  
>other than for the individuals to judge if they will be in range. Versus  
>the cellular model, which needs a sizable group of people to support the  
>high cost central site.

Is this really a good idea? For all practical purposes, this eliminates any  
sort of an organized network that is available in emergencies, one of the  
prime reasons we even have the badns in the first place.

> I see SS as a necessary tool for High Speed Packet networking.  
>I came to this opinion, thru experience, and the discussions that led to  
>the DDMA/WAN concept. Originally, the only value I saw to SS, was that a  
>DSSS/DMF off the shelf chip, could lock up in one symbol time, with out  
>any noise bandwidth increase. This is neat, of itself, but not all that  
>needed, until u try to do a home based megabaud network. U know, ATT  
>Long Lines ran multimegabaud microwave links, with out any SS, for years  
>and years. But they did have the advantage of megabuck sites and  
>antennas. The radio technology to do this has become quite cheap in this  
>past decade. But, the physics of the microwave path remains the same. SS  
>is probably the only way to get the megabaud into the home qth that is  
>not on mounted on a tower, on the best high ground around.

I tend to be very practical in my approach to this problem... At the rate  
things are going, we not have packet to worry about networking unless some  
of the problems are fixed soon.

> So, I guess, the question is not really one of SS for High Speed  
>data or not, but do u want to do ur network the way they have been in  
>the past, or to do it by something resembling the DDMA-WAN way? Where  
>the network is grown, rather than built. I personally cannot see the way  
>things have been done, even in places where that way has been  
>successful, continuing for a long time. The Internet's popularity  
>changes it all. If we continue building ATT style links, and drops,  
>without any way of funding it, we will loose out to people doing that,  
>with funding. If we build DDMA-WAN radio/antenna, we have a chance of  
>growing networks that will be omni-useful to all hams, and supported and  
>installed by all hams. Just as the any ham would throw on a SSB HF  
>station, now.

Again, I'm not sure...

As you point out, SS is probably the way to get very high speeds into the  
user's house, but how far away from that in time? 6 months? A year?

I believe that to provide reliable, predictable emergency services, there  
must be some sort of organized network, perhaps something that users can  
access, but this may pose a few problems as well, especially in high  
population areas where you could have hundreds (maybe more) of users jumping  
on at once.

>73, Don.

Take Care & 73

Marty Albert - [marty@trucom.com](mailto:marty@trucom.com)  
Amateur Radio: KC6UFM#KC6UFM.#SEMO.MO.USA.NOAM

\*\*\*\*\*  
Interested in Amateur Radio?  
<http://www.trucom.com/ppages/marty>  
\*\*\*\*\*  
HAMPS Coordinator  
<http://www.geocities.com/CapeCanaveral/Lab/7067>  
\*\*\*\*\*

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## 140. Re:Is SS The Solution For High Speed Packet

From: Don Lemke <[wb9mjn@wb9mjn.ampr.org](mailto:wb9mjn@wb9mjn.ampr.org)>  
Date: Tue, 27 May 1997 11:04:43 -0500  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <338B061B.53D4@wb9mjn.ampr.org>  
Rendered body type: text/plain

Hi Again Marty,

I first started thinking about the user to user type network, when I realised that we were not going to get the clubs to put on a user access network at microwave. Our local club has done allot, but one of its failings, is that it never brought 9600 baud to the masses. And, even thinking about megabaud to users was unreasonable fairy-tale waste of time to the club.

We in packet, have developed a momentum. And that momentum is holding us back. We are kinda like GM in the late 70 s. And along came the Japanese, or should i say the Internet.

Im not sure where u are Marty, but i think ur in western Mo. On the drive down to Dallas for the CNC year before last, we drove thru the Ozarks. What a wonderful land of Microwave paths! The rolling hills are perfect for being able to do economical high baud rate links. I m sure Cheap megabaud links are doable there, without SS. But, where does that leave the rest of us?

So, how do we get around the momentum, the lack of hills, the lack of critical mass? Any microwave data networking system can be made scalable, that s how. Make it work from the start, for a network of 2 people, or 4, or 16, or 256, and so on. Because, to start, only 2 people are going to try it. Microwaves and Megabaud are too technically "big" to switch too, without a good teathing period. And, then if it works, it grows on its own, with individual users doing the work. Rather than overloaded technical designees. That was the germ that got me into the discussions that led to DDMA/WAN idea.

> I agree... SS does potentially offer a solution. But we need inexpensive,  
> reproducible information made widely available. Without that, all the  
> wonderful theory and research will just gather dust.

Well, we all contribute what we can. My strengths, as I see it, is in congealing the technical communities goals and concerns into a technical system design. I ve been doing this for some years, in amateur packet radio. I know i can t do it all, if i could, i would just do it. But I do think I m good at the brain storming side of the technical system design. I hope my vision of the DDMA/WAN is of benefit.

> Are there any plans or details available for such a system that is ready to  
> go on the air?

I m not real strong in modern circuit board fabrication. I certainly do not have the resources to do SSOP surface mount. A rework machine for this level of fabrication is on the order of \$3000. A rework machine would be something that would be needed to assemble prototypes.

Modern economical radios are all built around this size of chip. I would have no problem with the Slovenian Radios. I have built up 3 of the DF9IC 1.2 Ghz full duplex radios, which are very similar, but lower data rate. I can do modern antennas. BTW, the Ham Panel 440 is working well making contacts via the MIR FM repeater from the apartment, here, as well as sending u these emails, hi.

> Not sure if comparing packet to the Internet is either valid or fair... Most  
> packet users I know have totally different expectations for packet than they  
> do for their Internet connection. A couple of the reasonable complaints that  
> packet users do have are:  
> Why should it take a week or more to get a message across country?  
>  
> Why should it take 3 hours to download a 50K file?

I m really not comparing packet to the internet. More like to to the Internet access providers. Ham Radio networks cannot compete with the Internet's capacity to support millions of users simultaneously. But we should support our own usership, accessing resources from the Internet.

What are we going to do with a fast network, ignore all the things from the Internet? No, users will want Internet activities, as well as ham. Indeed your first complaint is basically solved by the Email model of mail transport thru Internet gateways. Any technical group that holds themselves off the Internet has more to loose, than to gain. The Slovenians used a web page to get the word out on their radio. This is another good example of why we need Internet connectivity and TCP/IP standardisation.

> Is this really a good idea? For all practical purposes, this eliminates any  
> sort of an organized network that is available in emergencies, one of the  
> prime reasons we even have the badns in the first place.

Not really. Just because the equipment is different, does not mean people can t organise it for any particular purpose. We also have other primary Ham Radio purposes that justify the DDMA/WAN. That of technical experimentation, and training.

Its not apparent that a cellular style ham packet network will work better in emergencies, than a DDMA/WAN. My opinion is that the DDMA/WAN will do better, because its more distributed. If lightning takes out a cellular style site, there is a big hole in the network. If lightning takes out a DDMA/WAN site, there is a little hole. In an earthquake, the DDMA/WAN antenna can reorient automatically, if the original bearing changes. For DDMA/WAN to work, each user needs to leave it on 24 hours a day. There s more resources available, when something happens. Shorter ranges of the DDMA/WAN increase the acceptable bearing displacement, as well. This is a simplification, of course.

I guess what ur trying to get at is that the central funding organisation, the Ham Packet Club, can act to provide for the emergency capability goal. Yea, maybe. If its still around. If everybody who uses the network pays dues.

On ur final comments. Cellular style Ham packet networks rarely have predictable coverage, in the face of storms. This is because the money was spent on the basic capability, and there was n t much left over. With the DDMA/WAN, the individuals pay to play, but also get something tangible to sell, if they don t want to play anymore. This way, more money gets put into the network. And the more money in a network, the more reliable it will be. In the DDMA/WAN case, its because there are more radios out there, turned on. In the Cellular style case, if the money is spent, its on cavities and grounding. But if there is no money, there is no reliability. The reliability problem comes down to providing the general ham population something they want, so they will spend on it.

There is no reason that people using DDMA/WAN hardware can not organise themselves to do the emergency mission.

DDMA/WAN is the superior technigue in high population/high demand areas, because it milks every last megabaud-second, out of the

time-bandwidth-area resource. So, if everybody did get on, at once, it would be very hard to overload the DDMA/WAN network. A typical cellular style ham system (non-ss), on the other hand would be easy to overload, because the access is at tens of kilobaud. Whereas the DDMA/WAN has megabaud right into every qth. Each DDMA/WAN qth could throw on access for mobiles and opportunistic situations, on 9600, whatever, with a few hundred milliwatts, to cover his neighborhood.

I can't see the emergency mission as our primary go/nogo decision maker. We are here to push the envelope, not to be sure the network can survive an act of God. I apologise to the group for typing as much as I have about emergency trade-offs. If the a high speed packet network is built, then it will be up to emergency clubs in Ham Radio to make it robust for their purposes. Our purpose is to make it happen in the first place, and we should not be sidetracked, as we have in the past, by trying to make sure one all the missions in Ham Radio are felled by our efforts.

--

73, Don.

AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]  
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu  
Finger: wb9mjn@wb9mjn.ampr.org

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## 141. Re: [SS:1471] Re:Is SS The Solution For High Speed Packet

From: "Dale Heatherington" <wa4dsy@wa4dsy.radio.org>  
Date: Tue, 27 May 97 13:28:15  
To: "ss@tapr.org" <ss@tapr.org>  
Message-ID: <199705271728.RAA62441@out1.ibm.net>  
Rendered body type: text/plain

On Mon, 26 May 1997 22:33:47 -0500 (CDT), Marty Albert wrote:

>The WA4DSY is a great system, although limited to 56 Kbps and outrageously  
>priced. (I have seen the older "GRAPES" versions modified for a little more  
>than 256 Kbps) The big problem I see with the WA4DSY system is the price...  
>You're looking at nearly \$1,000.00 per station to get the thing on the air.  
>Frankly, that is ridiculous.

Hams don't seem to value digital gear like they do SSB and FM.  
I see Kenwood HF rigs priced from \$1820.00 to \$3200.00 in my HRO  
catalog. I see a Yaesu FT-1000D for \$4099!! I imagine a few will  
connect \$500 transverters to these rigs so they can work satellite or  
weak signal UHF. They also will spend \$300 to \$600 for an FM HT and between  
\$350 and \$700 for mobile FM radios. These HTs and mobile radios  
don't last too long either. Some hams I know buy a new HT about every 3 or 4 years.

The most expensive part of a 'DSY 56k station is the transverter if you buy  
it new. Ironically the transverter is the simplest and lowest tech part. I suspect  
the reason for the high price is the fact that they are hand-made to order.  
Would a cheap transverter make 56k more popular? How cheap would  
it have to be?

FYI  
--56k prices --  
\$350 56K modem  
\$435 New transverter (used as low as \$150)  
\$125 PI2 Card  
-----  
\$910 Total

Considering the performance and what other ham gear sells for I  
don't think this is unreasonable. The cost could be reduced if  
someone would design and manufacture a cheaper transverter.  
There no reason it should cost much more than a linear power amp.  
It could also be installed inside the modems case since there's room  
for another 7x7 inch pc board in there. Any RF jocks up to the challenge?

-----  
Dale Heatherington, WA4DSY  
e-mail - daheath@ibm.net  
Web page - http://www.wa4dsy.radio.org  
OS/2 Warp 4.0 The worlds finest desktop OS.

---

## 142. Re: [SS:1472] Re:Is SS The Solution For High Speed Packet

From: Marty Albert <marty@trucom.com>  
Date: Tue, 27 May 1997 19:13:22 -0500  
To: ss@tapr.org  
Message-ID: <1.5.4.32.19970528001322.0068d620@mail.trucom.com>  
Rendered body type: text/plain

At 11:16 05/27/97 -0500, Don WB9MJN wrote:

>Hi Again Marty,  
>  
>  
> I first started thinking about the user to user type network,  
>when I realised that we were not going to get the clubs to put on a user  
>access network at microwave. Our local club has done allot, but one of  
>its failings, is that it never brought 9600 baud to the masses. And,  
>even thinking about megabaud to users was unreasonable fairy-tale waste  
>of time to the club.  
>  
> We in packet, have developed a momentum. And that momentum is  
>holding us back. We are kinda like GM in the late 70 s. And along came  
>the Japanese, or should i say the Internet.

Good comparison, actually... Sad, but good!

> Im not sure where u are Marty, but i think ur in western Mo. On  
>the drive down to Dallas for the CNC year before last, we drove thru the  
>Ozarks. What a wonderful land of Microwave paths! The rolling hills are  
>perfect for being able to do economical high baud rate links. I m sure  
>Cheap megabaud links are doable there, without SS. But, where does that  
>leave the rest of us?

I'm in SEMO... Not quite as high of hills as the "True Ozark" areas, but still has a lot of good paths to consider.

> So, how do we get around the momentum, the lack of hills, the  
>lack of critical mass? Any microwave data networking system can be made  
>scalable, that s how. Make it work from the start, for a network of 2  
>people, or 4, or 16, or 256, and so on. Because, to start, only 2 people  
>are going to try it. Microwaves and Megabaud are too technically "big"  
>to switch too, without a good teathing period. And, then if it works, it  
>grows on its own, with individual users doing the work. Rather than  
>overloaded technical designees. That was the germ that got me into the  
>discussions that led to DDMA/WAN idea.

Again, we need something very soon. Here in MO, we have the MOAmPS 9600 "Backbone" that has been more or less under development for at least 4 years. It is still not made from St. Louis to Kansas City with any reasonable reliability or speed. Why? From talking to several people in the areas that the MOAmPS system serves (I live about 100 miles from the nearest point), there seem to be several major problems... (NOTE: this info is from people who live where the backbone is actually at and I have no experience directly with this)

\* The backbone is not open... That is, it can only be used for "approved" traffic types.

\* It is very hard to get approval to connect "spurs" to the backbone.

\* It was 10+ years out of date when started.

The first issue seems to be, at least here in SEMO, the big problem. We have some Hams who hate some of the digital services so badly that they get a

bit, well, crazy. Had one fellow a few years back (now SK) who would allow only keyboard to keyboard contacts of one hop through his nodes (he had 6 of them). (ie I connect to the node then to you... NOT to another node then on to another station!)

Anyway... This has lead to a lot of segregation of services and, hence, the people themselves. The APRS folks up in Kansas City are even developing (or trying to) their own backbone system for APRS traffic.

In rural areas like this one (only 14,000 people in the county and about 8-9 Hams), there is no way that multiple networks would be supported. Surrounding counties are not much different, so we are looking at an area here perhaps 125 miles by 100 miles where ONE network will need to carry the load.

While perhaps not the best solution for areas with higher populations of Hams, in areas like this, it seems that there would need to be a planned network to ensure coverage and operation for emergency use.

> > I agree... SS does potentially offer a solution. But we need  
> inexpensive,  
>> reproducible information made widely available. Without that, all the  
>> wonderful theory and research will just gather dust.  
>  
>  
> Well, we all contribute what we can. My strengths, as I see  
> it, is in congealing the technical communities goals and concerns into a  
> technical system design. I ve been doing this for some years, in amateur  
> packet radio. I know i can t do it all, if i could, i would just do it.  
> But I do think I m good at the brain storming side of the technical  
> system design. I hope my vision of the DDMA/WAN is of benefit.

To get something out that is usable in a practical sense, as opposed to a neat gizmo, I agree that it will need to be some sort of team effort.

Myself, I don't know, or care for that matter, what form the final system will take. I can, however, see some of the qualities that it will need to have...

- 1) Inexpensive. Homebrew is fine as long as no very unusual skills (or what-ever) are needed to build the thing.
- 2) Widely available, free or at copy cost, documentation and details.
- 3) Some group (probably informal) willing to help those working with the system.
- 4) As high of speed and bandwidth as possible to eliminate redundant networks.
- 5) Easy to extend.

>> Are there any plans or details available for such a system that is ready to  
>> go on the air?  
>  
>

> I m not real strong in modern circuit board fabrication. I  
> certainly do not have the resources to do SSOP surface mount. A rework  
> machine for this level of fabrication is on the order of \$3000. A rework  
> machine would be something that would be needed to assemble prototypes.  
> Modern economical radios are all built around this size of chip. I would  
> have no problem with the Slovenian Radios. I have built up 3 of the  
> DF9IC 1.2 Ghz full duplex radios, which are very similar, but lower data  
> rate. I can do modern antennas. BTW, the Ham Panel 440 is working well  
> making contacts via the MIR FM repeater from the apartment, here, as  
> well as sending u these emails, hi.

I would see more of a one-off approach... That's like the Paccomm version of the new GRAPES modems... From my best estimate, there is only about \$80.00 worth of parts there (buying as needed vs bulk prices) and, as a rough estimate, perhaps an hour of machine labor. The thing sells for \$350.00. The only thing that the average Ham probably couldn't do is the 4 layer PCB. Not a big deal... Design it like the original GRAPES modem on multiple boards. Just about anyone can do double sided boards.

For SS and other advanced goodies (DSP?), as long as the code for the chips is available (see above), most folks can get EPROMS burned. as time passes, PIC and other programmers are also getting cheaper. One of the places where I buy chips has one of the fancy programmers (I think it will program chips



that haven't been invented yet!) and will program any chip you buy from them for \$1.00 if you have the code on an IBM or Mac disk.

>> Not sure if comparing packet to the Internet is either valid or fair... Most  
>> packet users I know have totally different expectations for packet than they  
>> do for their Internet connection. A couple of the reasonable complaints that  
>> packet users do have are:  
>> Why should it take a week or more to get a message across country?  
>>  
>> Why should it take 3 hours to download a 50K file?  
>  
>  
> I m really not comparing packet to the internet. More like to to  
>the Internet access providers. Ham Radio networks cannot compete with  
>the Internet's capacity to support millions of users simultaneously.  
>But we should support our own usership, accessing resources from the  
>Internet.

That I can buy... Problem is, we can't do that now. The 9600 bps "backbones" can't do it. A 56 Kbps might do it (close in, anyway).

> What are we going to do with a fast network, ignore all the  
>things from the Internet? No, users will want Internet activities, as  
>well as ham. Indeed your first complaint is basically solved by the  
>Email model of mail transport thru Internet gateways. Any technical  
>group that holds themselves off the Internet has more to loose, than to  
>gain. The Slovenians used a web page to get the word out on their radio.  
>This is another good example of why we need Internet connectivity and  
>TCP/IP standardisation.

I agree... Even if, for legal reasons, we can't allow indiscriminate "Surfin'", the Internet allows for things like: World wide DX Clusters; World Wide Chat servers; Store and forward message routing; and more.

I won't get into the NAmbia vs NOrth AMerica issue... :)

>> Is this really a good idea? For all practical purposes, this eliminates any  
>> sort of an organized network that is available in emergencies, one of the  
>> prime reasons we even have the badns in the first place.

>  
>  
> Not really. Just because the equipment is different, does not  
>mean people can t organise it for any particular purpose. We also have  
>other primary Ham Radio purposes that justify the DDMA/WAN. That of  
>technical experimentation, and training.

>  
> Its not apparent that a cellular style ham packet network will  
>work better in emergencies, than a DDMA/WAN. My opinion is that the  
>DDMA/WAN will do better, because its more distributed. If lightning  
>takes out a cellular style site, there is a big hole in the network. If  
>lightning takes out a DDMA/WAN site, there is a little hole. In an  
>earthquake, the DDMA/WAN antenna can reorient automatically, if the  
>original bearing changes. For DDMA/WAN to work, each user needs to leave  
>it on 24 hours a day. There s more resources available, when something  
>happens. Shorter ranges of the DDMA/WAN increase the acceptable bearing  
>displacement, as well. This is a simplification, of course.

Perhaps... I need to look a little more the DDMA/WAN style of operation, but I can see huge holes in areas (like entire counties or states) where we not be able to reach just because no one has wanted to set up a system yet. There would need to be ways to "get around" the holes.

> I guess what ur trying to get at is that the central funding  
>organisation, the Ham Packet Club, can act to provide for the emergency  
>capability goal. Yea, maybe. If its still around. If everybody who uses  
>the network pays dues.

heh! Not the local ARC here! We had to turn off the repeater autopatch cause we can't afford the phone bills!

> On ur final comments. Cellular style Ham packet networks rarely  
>have predictable coverage, in the face of storms. This is because the  
>money was spent on the basic capability, and there was n t much left  
>over. With the DDMA/WAN, the individuals pay to play, but also get

>something tangible to sell, if they don't want to play anymore. This  
>way, more money gets put into the network. And the more money in a  
>network, the more reliable it will be. In the DDMA/WAN case, its because  
>there are more radios out there, turned on. In the Cellular style case,  
>if the money is spent, its on cavities and grounding. But if there is no  
>money, there is no reliability. The reliability problem comes down to  
>providing the general ham population something they want, so they will  
>spend on it.

Again, I need to look at this some more.

> There is no reason that people using DDMA/WAN hardware can not  
>organise themselves to do the emergency mission.  
>  
> DDMA/WAN is the superior technigue in high population/high demand  
>areas, because it milks every last megabaud-second, out of the  
>time-bandwidth-area resource. So, if everybody did get on, at once, it  
>would be very hard to overload the DDMA/WAN network. A typical cellular  
>style ham system (non-ss), on the other hand would be easy to overload,  
>because the access is at tens of kilobaud. Whereas the DDMA/WAN has  
>megabaud right into every qth. Each DDMA/WAN qth could throw on access  
>for mobiles and oportunistic situations, on 9600, whatever, with a few  
>hundred milliwatts, to cover his neighborhood.  
Yep... I can see how this will work in high population areas, but what about  
the low population areas? Are we looking at "LANs" using DDMA systems  
connected together with more conventional very high speed backbones?

> I can't see the emergency mission as our primary go/nogo decision  
>maker. We are here to push the envelope, not to be sure the network can  
>survive an act of God. I appologise to the group for typing as much as I  
>have about emergency trade-offs. If the a high speed packet network is  
>built, then it will be up to emergency clubs in Ham Radio to make it  
>robust for their purposes. Our purpose is to make it happen in the first  
>place, and we should not be sidetracked, as we have in the past, by  
>trying to make sure one all the missions in Ham Radio are fetted by our  
>efforts.

I agree that no one of the missions can dictate the entire system, but we  
need to think about them before things get built. If it is left up to the  
emergency groups to make the network robust, what needs to be done, if  
anything, now to allow them to be able to do that later?

Again, I am taking a results oriented approach to all of this... As I said  
above, the final form that a system takes is really of little, if any, real  
importance at this time. I doubt that anyone involved in digital modes would  
argue that the system is broke. It seems that it is broke nearly to the  
point of being beyond repair. Perhaps, in any event, this is the time to  
simply rebuild as opposed to fixing.

In areas like where I am, there really is no network, so what-ever we end up  
with will be a fresh start. We don't have to worry about keeping something  
running while we build a new system.

What is important, however, is to have something that works. A few of the  
other qualities I think the system will need were listed above.

Maybe SS is the answer, but when will the answer come?

Take Care & 73

Marty Albert - [marty@trucom.com](mailto:marty@trucom.com)  
Amateur Radio: KC6UFM@KC6UFM.#SEMO.MO.USA.NOAM

\*\*\*\*\*  
Interested in Amateur Radio?  
<http://www.trucom.com/ppages/marty>  
\*\*\*\*\*  
HAMPS Coordinator  
<http://www.geocities.com/CapeCanaveral/Lab/7067>  
\*\*\*\*\*

---

### 143. Re: [SS:1473] Re:Is SS The Solution For High Speed Packet

From: Marty Albert <[marty@trucom.com](mailto:marty@trucom.com)>  
Date: Tue, 27 May 1997 19:53:21 -0500  
To: [ss@tapr.org](mailto:ss@tapr.org)

Message-ID: <1.5.4.32.19970528005321.00675bc8@mail.trucom.com>  
Rendered body type: text/plain

At 12:31 05/27/97 -0500, Dale WA4DSY wrote:  
>Hams don't seem to value digital gear like they do SSB and FM.  
>I see Kenwood HF rigs priced from \$1820.00 to \$3200.00 in my HRO  
>catalog. I see a Yaesu FT-1000D for \$4099!! I imagine a few will  
>connect \$500 transverters to these rigs so they can work satellite or  
>weak signal UHF. They also will spend \$300 to \$600 for an FM HT and between  
>\$350 and \$700 for mobile FM radios. These HTs and mobile radios  
>don't last too long either. Some hams I know buy a new HT about every 3 or  
4 years.

You are 100%+ right, Dale! Not sure why this is, but it sure is so.

>The most expensive part of a 'DSY 56k station is the transverter if you buy  
>it new. Ironically the transverter is the simplest and lowest tech part.  
I suspect  
>the reason for the high price is the fact that they are hand-made to order.  
>Would a cheap transverter make 56k more popular? How cheap would  
>it have to be?

Good question... Just off the top of my head, I would say that if an entire  
station for 56 Kbps could be put together for < \$500.00, it would probably  
be in the ball park for "normal" users. See below.

On the other hand, I can buy a Part 15 device that gives me 128 Kbps for a  
little more \$\$\$ than the ~\$1,000.00 current cost. Of course, I would need to  
make a few "modifications" (like new antenna connectors and such) to save a  
few \$\$ by using my own cables (as opposed to their \$200.00 50' jobs!) and  
using homebrew antennas (vs their \$200 13 element Yagi!).

<snip>

>Considering the performance and what other ham gear sells for I  
>don't think this is unreasonable. The cost could be reduced if  
>someone would design and manufacture a cheaper transverter.  
>There no reason it should cost much more than a linear power amp.  
>It could also be installed inside the modems case since there's room  
>for another 7x7 inch pc board in there. Any RF jocks up to the challenge?

I think that, to an extent, the problem is two-fold... You can get a 1200  
bps TNC for about \$100 (give or take a little) and hook that to your \$600.00  
dual band Whiz-Bang HT and your \$5000.00 Pentium Pro 200 Video Game... er  
Computer (couldn't resist!) and be on the air. I know several users (local  
here in SEMO) who have said that they would spend what-ever was needed to  
get higher speed IF the network supported it... Problem is, the "network",  
and I use the term VERY loosely, here is 1200 bps TheNET nodes.

The real problem is to make it inexpensive for those building the network.  
The work we are (just starting) doing here in SEMO on the network looks like  
we will need (assuming 23cm) about 12 backbone nodes to get the initial  
coverage needed. Final coverage will probably bring the total to about 20  
nodes. If we estimate \$1,000.00 for each node (\$910.00 from your total plus  
a cheap computer for the SCC card and to run the node software, or some sort  
of stand alone node computer), this is \$20,000.00. Frankly, it ain't gonna  
happen, at least not here.

Maybe if we could talk Paccomm into giving us about 20 systems for PR... :)

But, there is another problem in this particular QTH, and I suspect many  
others as well... We are talking about a large area (more than 10,000 square  
miles) of low population (both public and Ham) density. It is not unusual to  
have paths of 60 miles between places where a LAN would make sense to serve  
a "cluster" of Hams. I think that the 56 Kbps speed would be marginal, at  
best. I have been thinking more along the lines of 256 Kbps as a minimum,  
with even faster preferred.

Frankly, I don't know where all this will end up... All I know is that there  
is a problem to solve.

Take Care & 73

Marty Albert - marty@trucom.com  
Amateur Radio: KC6UFM@KC6UFM.#SEMO.MO.USA.NOAM

\*\*\*\*\*

Interested in Amateur Radio?  
<http://www.trucom.com/ppages/marty>  
\*\*\*\*\*  
HAMPS Coordinator  
<http://www.geocities.com/CapeCanaveral/Lab/7067>  
\*\*\*\*\*

---

#### 144. Re: [SS:1469] Re: Is SS The Solution For High Speed Packet

From: Lyle Johnson <lylej@azstarnet.com>  
Date: Tue, 27 May 1997 19:26:54 -0700  
To: ss@tapr.org  
Message-ID: <3.0.32.19970527191959.007309dc@pop.azstarnet.com>  
Rendered body type: text/plain

>Given enough bandwidth, digital voice is no problem... Even at 56 Kbps it is  
>possible (the quality is not too great, but it's not all that bad). This  
>needs some more thought time!

Don't the CDMA cell phones use a variable speed vocoder and run at maximum  
9600 bit/sec?

Cheers,

Lyle

---

#### 145. Comments on Docket 97-12

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Wed, 28 May 1997 21:04:23 -0500  
To: " Spread Spectrum "<ss@tapr.org>  
Message-ID: <v03020930afb29456c1f3@[208.134.134.40]>  
Rendered body type: text/plain

We have continued to add comments to Docket 97-12 to the web page. We have  
about three more to add.

<http://www.tapr.org/ss>

Cheers - Greg

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>  
-----

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#### 146. Re: [SS:1473] Re:Is SS The Solution For High Speed Packet

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>  
Date: Thu, 29 May 1997 02:29:19 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <199705290229.CAA30078@lynx.ve3jf.ampr.org>  
Rendered body type: text/plain

"Dale Heatherington" <wa4dsy@wa4dsy.radio.org> wrote:  
>  
> FYI  
> --56k prices --  
> \$350 56K modem  
> \$435 New transverter (used as low as \$150)  
> \$125 PI2 Card  
> -----  
> \$910 Total

You can lop a bit more off that total, since the PI2 is now available as a  
semi-kit for \$60 - you need to find the parts not included in the kit, though.

On another topic more in the SS vein, has anybody come across a product called  
WaveRider? Check out <http://www.chli.mwc.net/products/index.html>. They claim  
to be able to do up to 10 Mbps using SS in the 900 MHz ISM band. To get 10  
Mbps throughput and stay within a 26 MHz bandwidth while maintaining a minimum  
of 10 dB processing gain (as required under Part 15) ain't too easy - it would  
a DSSS system that provides 5 bps/Hz- 32QAM, maybe. This doesn't sound too  
robust in a multipath environment, but they're claiming 18 km PTP and 7 km  
omnidirectional range. They're pitching this as a product to allow ISPs to  
hook up customers by wireless. The modem specs contain some real techno-babble,  
for instance:

Maximum Signal-to-Noise Ratio: >100db below ambient noise level

Beats me what the heck that means, if anything. The whole thing smacks of vaporhardware... anybody know different?

Barry

--

|                           |              |  |           |                          |
|---------------------------|--------------|--|-----------|--------------------------|
| Barry McLarnon            | VE3JF/VA3TCP |  | Internet: | bm@hydra.carleton.ca     |
| Ottawa Amateur Radio Club |              |  | AMPRnet:  | bm@lynx.ve3jf.ampr.org   |
| Packet Working Group      |              |  | Web:      | http://hydra.carleton.ca |

---

## 147. Re: [SS:1478] Re:Is SS The Solution For High Speed Packet

From: Jeff King / Kathy King <jeff@mich.com>  
Date: Thu, 29 May 1997 03:34:43 -0400  
To: ss@tapr.org  
Message-ID: <2.2.32.19970529073443.00995cfc@mail.mich.com>  
Rendered body type: text/plain

At 09:31 PM 5/28/97 -0500, Barry McLarnon VE3JF wrote:

>On another topic more in the SS vein, has anybody come across a product called  
>WaveRider? Check out <http://www.chli.mwc.net/products/index.html>. They claim  
>to be able to do up to 10 Mbps using SS in the 900 MHz ISM band. To get 10  
>Mbps throughput and stay within a 26 MHz bandwidth while maintaining a minimum  
>of 10 dB processing gain (as required under Part 15) ain't too easy - it would  
>a DSSS system that provides 5 bps/Hz- 32QAM, maybe. This doesn't sound too  
>robust in a multipath environment, but they're claiming 18 km PTP and 7 km  
>omnidirectional range. They're pitching this as a product to allow ISPs to  
>hook up customers by wireless. The modem specs contain some real techno-babble,  
>for instance:  
>  
>Maximum Signal-to-Noise Ratio: >100db below ambient noise level  
>  
>Beats me what the heck that means, if anything. The whole thing smacks of  
>vaporhardware... anybody know different?  
>  
>Barry  
>

They (waverider) were pitching franchises about a year or so ago on comp.std.wireless.... Never replied to my queries as to more specifics on there product. My impression of it was the same as yours. I'll look at it again.

-Jeff

---

## 148. Re: [HFSIG:2113] Negative SNR, SS and FEC.

From: Phil Karn <karn@qualcomm.com>  
Date: Thu, 29 May 1997 01:06:19 -0700 (PDT)  
To: hfsig@tapr.org, ss@tapr.org  
Message-ID: <199705290806.BAA26416@servo.qualcomm.com>  
Rendered body type: text/plain

>1. It is said that a spread spectrum system can work at negative SNR's.  
>How does this tie in with Shannons Limit of -1.6dB ?

The other responders have answered this well, so I'll just reiterate that SNR and  $E_b/N_0$  are not the same thing; they're related by a factor equal to the bit rate divided by the bandwidth. For a spread system, the SNR in the full spread bandwidth is much lower than the  $E_b/N_0$ . \*No\* system, spread or not, can operate at a  $E_b/N_0 < -1.6$  dB.

>2. What is the difference between spread spectrum process gain and  
>coding gain that one can obtain from say Viterbi FEC ?

Both process gain and coding gain can lower the required SNR in the RF channel bandwidth, because both have the effect of spreading the signal energy over a wider bandwidth. But only coding gain can lower the required  $E_b/N_0$  (but never below -1.6 dB).

Phil

---

## 149. Re: [SS:1478] Re:Is SS The Solution For High Speed Packet

From: "Robert A. Buaas" <buaas@wireless.net>  
Date: Thu, 29 May 1997 11:10:54 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705291810.LAA17595@wireless.net>

Rendered body type: text/plain

Barry--

after reading the web page:

<http://www.chli.mwc.net/products/index.html>,

I decided to look these guys up in the InterNIC database, since the webpage did not provide any links. What I found was:

Major Wireless Communications Inc. (MWC2-DOM)

PO Box 538  
Salmon Arm, BC  
V1E 4N6  
Salmon Arm, BC V1E 4N6  
Canada

Domain Name: MWC.NET

Administrative Contact:

Antoine, Rick (RA1267) rick@JETSTREAM.NET  
(250) 832-0911 (FAX) 250) 832-0062

Technical Contact, Zone Contact:

Grant, Stephen (SG618) steve@JETSTREAM.NET  
604) 8320911

Billing Contact:

Grant, Stephen (SG618) steve@JETSTREAM.NET  
604) 8320911

Looks like we have some countrymen of yours, albiet just outside Vancouver, may or may not be producing vapor!! Reading the "datasheets" suggests a mixture of numbers. Getting 20mbps on 902-928, given what I know about FCC 15.247, pretty much lets them outside this section. I'd be very interested to learn if they have FCC Type Approval, and if so, what the number is.

I suspect they are not answering the phone, to answer questions...

best regards/bob K6KGS

---

## 150. Re: [SS:1481] Re:Is SS The Solution For High Speed Packet

From: Dewayne Hendricks <dewayne@warpspeed.com>

Date: Thu, 29 May 1997 13:12:15 -0700

To: ss@tapr.org

Message-ID: <v03102816afb3926e14c5@[204.118.182.22]>

Rendered body type: text/plain

At 12:58 PM -0500 5/29/97, Robert A. Buaas wrote:

>Looks like we have some countrymen of yours, albiet just outside  
>Vancouver, may or may not be producing vapor!! Reading the  
>"datasheets" suggests a mixture of numbers. Getting 20mbps on  
>902-928, given what I know about FCC 15.247, pretty much lets them  
>outside this section. I'd be very interested to learn if they  
>have FCC Type Approval, and if so, what the number is.

I did a search of the FCC's Part 15 certification database and didn't find any equipment authorizations for "Major Wireless Communications Inc.".

It looks like 'vaporware' to me also.

-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>
Fax: (510) 770-9854 !
~~~~~

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## 151. July 1st Resource

From: mailnet <mailnet@listcleanup.com>

Date: Thu, 29 May 1997 19:56:56

To: <ss@tapr.org>

Message-ID: <199705300054.TAA24829@edge.edge.net>

Rendered body type: text/plain

Most businesses are unaware of the new July 1st USPS regulation requiring all first class mail to be move update certified or lose valuable postage discounts.

MAILnet Services has built a web site to make compliance totally automated with NCOA processing at <http://www.listcleanup.com>

NCOA

Telephone Append

Data Enhancement

note: you were chosen to receive this message because of your affiliation with the industry. If this reached you by mistake, please excuse or forward this postal regulation to the person in your organization who handles your databases and postal compliance.

---

## 152. Comments to Docket 97-12

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Thu, 29 May 1997 21:52:59 -0500  
To: " Spread Spectrum "<ss@tapr.org>  
Message-ID: <v0302090eafb3f1242768@[208.134.134.40]>  
Rendered body type: text/plain

Steve Bible finsihed entering the last of the comments we have -- so the page is pretty much up to date.

Don't forget the reply comment period is coming quickly.

No excuses for not filing on the reply comments this time around. It could be as little as the filing that Robert Brown filed. You can simply state that you support certain aspect of the various comments made or against those that you think shouldn't be in the rules.

Cheers - Greg

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>  
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## 153. Re: [SS:1461] SS IF bandwidth

From: Phil Karn <karn@qualcomm.com>  
Date: Thu, 29 May 1997 21:00:39 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705300400.VAA10609@servo.qualcomm.com>  
Rendered body type: text/plain

>For example, assume that a data bit was sent by spreading it such that it  
>was sent at 8 different frequencies over the length of time required to send  
>that bit. It seems to me if a receiver were tuned to one of these

This assumes "fast frequency hopping". There's also slow frequency hopping ("slow" in the sense that the hop rate is slower than the data rate) and direct sequence, where the carrier doesn't hop at all.

>that bit. It seems to me if a receiver were tuned to one of these  
>frequencies  
>that it would see a pulse appearing at random intervals. The optimum IF

But the receiver isn't tuned to a fixed frequency, it hops to follow the transmitter -- as you later point out.

>Most likely the SS receiver does not work the way I have invisioned above  
>but works in some manner I have not thought of.

The method you have assumed, fast frequency hopping, is actually quite rare in practice. As far as I know, it is used mainly in military anti-jam environments where hopping must be very fast to defeat an intelligent jammer that listens to see where you are, jams that frequency, then listens again to see where you've gone next (follow-and-jam). If you can hop faster than the propagation delay to the jammer, you can defeat this particularly strategy.

This feature comes at a high price, namely a substantial "noncoherent combining loss" because of the noncoherent phase transition caused by each hop. For this reason it is generally impossible to maintain a carrier phase reference with fast frequency hopping, so you have to use less efficient (higher Eb/No) modulation schemes like FSK that can withstand rapid signal phase changes. Furthermore, if the hop rate is faster than the data rate, you have to accumulate the energy for each data bit noncoherently from hop to hop, which results in a further loss

of energy. The same thing happens when you layer a FEC code on top of a noncoherent scheme like FSK and you make the FEC code rate too low. The Eb/No requirements start to rise again.

Most commercial frequency hoppers are slow hoppers, meaning the hop rate is relatively slow compared to the data rate. This avoids the noncoherent combining losses involved in hopping faster than the data rate. If the hop rate is slow enough (and the channel cooperates) you can sometimes use a coherent modulation scheme. As long as you use enough coding and interleaving (i.e., it has to span many hops) you will still have plenty of resistance to narrowband interference.

Phil

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## 154. Re: [SS:1482] Re:Is SS The Solution For High Speed Packet

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>  
Date: Fri, 30 May 1997 04:37:26 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <199705300437.EAA31880@lynx.ve3jf.ampr.org>  
Rendered body type: text/plain

Dewayne Hendricks <dewayne@warpspeed.com> wrote:  
> At 12:58 PM -0500 5/29/97, Robert A. Buaas wrote:  
> > Looks like we have some countrymen of yours, albiet just outside  
> > Vancouver, may or may not be producing vapor!! Reading the  
> > "datasheets" suggests a mixture of numbers. Getting 20mbps on  
> > 902-928, given what I know about FCC 15.247, pretty much lets them  
> > outside this section. I'd be very interested to learn if they  
> > have FCC Type Approval, and if so, what the number is.  
>  
> I did a search of the FCC's Part 15 certification database and  
> didn't find any equipment authorizations for "Major Wireless Communications  
> Inc.".   
> It looks like 'vaporware' to me also.

How about Inficom (www.inficom.com)? They claim to be able to do 25.6 Mbps in the 902-928 band under Part 15. There are some remarkable similarities to the WaveRider stuff - data rates that stretch credibility, similar bogus-sounding specs in their product data (see the "Infilink ATM Wireless Modem"), and from what I've heard, if you try to buy their hardware, they try to sell you a franchise instead. They're also based in the PNW (something in the water over there? :-).

Barry

--

|                             |                                 |
|-----------------------------|---------------------------------|
| Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca  |
| Ottawa Amateur Radio Club   | AMPRnet: bm@lynx.ve3jf.ampr.org |
| Packet Working Group        | Web: http://hydra.carleton.ca   |

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## 155. Re: [SS:1486] Re:Is SS The Solution For High Speed Packet

From: Steve Stroh <strohs@halcyon.com>  
Date: Thu, 29 May 1997 23:03:13 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <Pine.ULT.3.96.970529225540.21870B-100000@chinook.halcyon.com>  
Rendered body type: text/plain

On Thu, 29 May 1997, Barry McLarnon VE3JF wrote:

> How about Inficom (www.inficom.com)? They claim to be able to do 25.6 Mbps  
> in the 902-928 band under Part 15. There are some remarkable similarities  
> to the WaveRider stuff - data rates that stretch credibility, similar  
> bogus-sounding specs in their product data (see the "Infilink ATM Wireless  
> Modem"), and from what I've heard, if you try to buy their hardware, they  
> try to sell you a franchise instead. They're also based in the PNW (something  
> in the water over there? :-).  
>  
> Barry

More like greed trying to seek out venture capital. There's a lot of wireless activity in the Seattle area.

Some of the Puget Sound Amateur Radio TCP/IP group got wind of Inficom a couple of years ago. At least one of the principals there is known to some members of the group as having at best a loose grasp of reality when it comes to wireless data. We've asked to get a couple of units to experiment with and we've been told Uh... we're not QUITE ready yet... but soon. Their claims are so preposterous that if even remotely true that



they would have put the rest of the wireless modem industry out of business.

Steve N8GNJ

--

Steve Stroh Woodinville, Washington, USA strohs@halcyon.com

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## 156. Re: [SS:1476] Re: Is SS The Solution For High Speed Packet

From: Phil Karn <karn@qualcomm.com>  
Date: Thu, 29 May 1997 23:35:45 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199705300635.XAA11091@servo.qualcomm.com>  
Rendered body type: text/plain

>Don't the CDMA cell phones use a variable speed vocoder and run at maximum  
>9600 bit/sec?

Originally, yes. Many carriers wanted better voice quality, so we implemented "Rate Set 2", where the four frame sizes are each increased by 50%. I.e., the peak data rate is now 14.4 kb/s, minus overhead. This is comparable to the (fixed) 13kb/s rate of the GSM vocoder, though we still win by having a variable rate.

BTW, Rate Set 2 was implemented by simply increasing the FEC convolutional code rates, e.g., from rate 1/2 to 3/4 on the forward link. The symbol and chip rates remain the same.

Phil

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## 157. Re: [SS:1486] Re:Is SS The Solution For High Speed Packet

From: Dewayne Hendricks <dewayne@warpspeed.com>  
Date: Fri, 30 May 1997 03:47:03 -0700  
To: ss@tapr.org  
Message-ID: <v0310281dafb45ece1f56@[204.118.182.22]>  
Rendered body type: text/plain

At 11:43 PM -0500 5/29/97, Barry McLarnon VE3JF wrote:  
>How about Inficom (www.inficom.com)? They claim to be able to do 25.6 Mbps  
>in the 902-928 band under Part 15. There are some remarkable similarities  
>to the WaveRider stuff - data rates that stretch credibility, similar  
>bogus-sounding specs in their product data (see the "Infilink ATM Wireless  
>Modem"), and from what I've heard, if you try to buy their hardware, they  
>try to sell you a franchise instead. They're also based in the PNW (something  
>in the water over there? :-).

Ah yes, Inficom. They've been around for about three years, but I have yet to see them produce a product that works as they claim. I've even offered to come up to their facility to see their equipment in operation and got put off with various excuses. I did a check of the FCC certification database for them and they also have no Part 15 equipment authorizations on record.

BTW, the FCC's database is available on the Web. If you ever want to do a check on a company's equipment authorizations or type acceptance on record, then just point your browser to: <<http://www.fcc.gov/fcc-bin/ead/>>.

-- Dewayne

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Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>
Fax: (510) 770-9854 !
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## 158. Data Radio Design

From: frussle@erols.com (Jake Brodsky)  
Date: Fri, 30 May 1997 14:26:15 GMT  
To: ss@tapr.org  
Message-ID: <338ec493.819200@smtp.erols.com>  
Rendered body type: text/plain

Tony, N3JLI, and I have decided to take a step backward and concentrate on building a high speed data radio. Although we have ideas for analog use of DS Spread Spectrum (as a sort of time domain linear transponder), we have decided that most of the SS radio design

difficulties can be addressed with the design of a data radio.

So we're focusing our efforts on a simple four state QAM radio. It is loosely patterned after the Mini-R2 and T2 designs that Rick Campbell, KK7B, described in QST around 1993 and 1994. We have added a pair of limiters, a Costas Loop for steering the LO, and are working on a Manchester encoder and decoder for the scrambling.

Those of you who are familiar with the Slovenian data radios may notice some similarities. Although we've been playing with prototypes around this concept for the last six months, we only became aware of their design last week. It seems we aren't the only ones pursuing this concept.

Anyway, our initial data rate is around 1 MBPS at 52 MHz, with the clocking derived from the LO. Note: we are NOT going on the air with this. In fact, we are thinking about moving this design directly to 2.3 GHz. The only reason we're on 52 MHz is because we had considered using a very similar design for the SS STA, and because there were some aspects about this band which made our initial prototype easier to construct.

Three issues are cropping up: First, can anyone give us a reference on how critical the 90 degree phase shift is? I ask this because with higher data rates it is more and more difficult to maintain an accurate 90 degree phase shift across the entire band width.

Currently, we're using the phase shift network described in the SPRAT Technical Cartoons #1 and #2. This is a reasonably wide band quadrature bridge. However, it has limits. We're using this bridge at 52 MHz in our prototype. At bandwidths of four or five MHz, I don't foresee many problems; however, I'm not sure how it may perform at wider bandwidths. (I'm thinking about possible experiments we can conduct if nobody comes up with a reference)

Second, what kind of transmit harmonic filters can we use? Can I use a third or fifth order Butterworth filter without too much concern over group delay distortion? How about second order IMD filters for the receiver? How about data rate filters? Or, as an alternative, does anyone have practical suggestions the average ham could use to compensate for group delay?

Third, for the eventual day when we use this platform for QAM spread spectrum, does anyone have suggestions for doing a Hilbert transform on the pseudo-noise? This is partly related to the first issue because if we can allow for some slop in the phase accuracy, then a simple delay line or phase shift network might suffice.

Thoughts?

Jake Brodsky, AB3A <mailto:frussle@erols.com>  
"Beware of the massive impossible!"

---

## 159. Re: [SS:1485] Re: SS IF bandwidth

From: N5RG@aol.com  
Date: Fri, 30 May 1997 11:48:02 -0400 (EDT)  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <970530114802\_1523509935@emout05.mail.aol.com>  
Rendered body type: text/plain

Phil:

Thanks for the info. The most important thing I have learned from your response is that I don't understand how SS works. If I want to figure it out I am going to have to do a lot more study. The ARRL book has been recommended to me as being a good place to start.

- > Most commercial frequency hoppers are slow hoppers, meaning the hop
- > rate is relatively slow compared to the data rate. This avoids the
- > noncoherent combining losses involved in hopping faster than the data
- > rate. If the hop rate is slow enough (and the channel cooperates) you
- > can sometimes use a coherent modulation scheme. As long as you use
- > enough coding and interleaving (i.e., it has to span many hops) you
- > will still have plenty of resistance to narrowband interference.

73, Roy W7IDM, ex N5RG, W5PAG

**160. RE: 1475] Re:Is SS The Solution For High Speed Packet**

From: Gwyn Reedy <gwyn@paccomm.com>  
Date: Fri, 30 May 1997 12:45:45 -0400  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <01BC6CF7.65C59220@gwyn>  
Rendered body type: text/plain

Ref comments in two messages from Marty Albert:

Disclaimer 1: I heartily encourage amateur construction projects. Just because my company makes 'things' I do not discourage others from rolling their own.

Disclaimer 2: I do not assume Marty was complaining about the price PacComm charges, merely that the total package ends up costing too much.

From: Marty Albert[SMTP:marty@trucom.com]  
Sent: Tuesday, May 27, 1997 3:18 PM  
To: ss@tapr.org  
Subject: [SS:1474] Re:Is SS The Solution For High Speed Packet

I would see more of a one-off approach... That's like the Paccomm version of the new GRAPES modems... From my best estimate, there is only about \$80.00 worth of parts there (buying as needed vs bulk prices) and, as a rough estimate, perhaps an hour of machine labor. The thing sells for \$350.00. The only thing that the average Ham probably couldn't do is the 4 layer PCB. Not a big deal... Design it like the original GRAPES modem on multiple boards. Just about anyone can do double sided boards.

From: Marty Albert[SMTP:marty@trucom.com]  
Sent: Tuesday, May 27, 1997 3:59 PM  
To: ss@tapr.org  
Subject: [SS:1475] Re:Is SS The Solution For High Speed Packet

Maybe if we could talk Paccomm into giving us about 20 systems for PR... :)

[illegible]

```

M+@6P9TE_>466=6(I$DL?0@-#$$%,A21 T-S1=(8$Z2>L&007P5#4A4P;P-. H
MHD)&!;%(:6=H!@P;0G@9#6B*R!T.Q\)\#@V,#R0,%\@)C$BH'5LOU- $?: J
M,06P+1$AL&$M(-AN92U8H%BQ<"CA`-#0.A!9\%&1)[ G!" \4"L@YS4#-;$A
MTB!V+6$HHEB@R^%-1)9``?@1U)!4/9%!$ 8FTI4%H!0+(J00\D,"FA7N$'
M<">Q-J M0B=PKP0`6.$FP32T)%4P+E5 _R%(J `(%+@6*$0L2(Q7\3P*&)U
M>31S!"!9`F 35,Q=@0@8S!L:55$<WXI)X XL#:@,\%8T -@=:J2T""^%7RA3
M$'(1P'!EH?T#H&@(85B2`,$K@2=P"V#_!N!,T%&3*W-8`2X0(T$%L?@D,S5A
M(FE#+X5@4VFD:3<W85NQ)U)()Y HTF+0`F P2<15^!N*V L`F A%342-&CA
M>27A4$-"W2E@3BQ0+X58T&)2P"P`=29P;%GR1 >04L #H&G_!4!:IP6P4L +
M@#?Q74I8X?TYT6PFH M0)W &X L1*5#_+X4I@S2T*L%8\2'`Y$!$?\L$ZP
M=0$`D&0`=3PO>#+_RCA)\ H@#Z/38]ZMT">HK_0@]#`T00?)][`D8/?0]'
MK_E(M34Y24^#`TK0?PY,?]^(CX.H3K^*_U!7-5#_4@_S4Q]4+C,V5D<9<@P!
M>L;?+X5(,20P(E AL'=W$5?#7S?A9*!;-@N -\ @<T!VWRXR*9 TI0'0C!!Y
M*$!=X<EJ4U!26?(Z*91^5GX+ENX:<0"?T `#`! 0` ``````,$1 ``````0 ``
M,"!L.)KI;+P!0 `(,*" A^L8;;P!'@`]'`$````%````4D4Z( ``````#``TT
&_3<``-GM
end

```

## 161. Re: [SS:1490] Data Radio Design

```

From: Marty Albert <marty@trucom.com>
Date: Fri, 30 May 1997 13:28:08 -0500
To: ss@tapr.org
Message-ID: <1.5.4.32.19970530182808.0069be7c@mail.trucom.com>
Rendered body type: text/plain

At 09:36 05/30/97 -0500, you wrote:
>Tony, N3JLI, and I have decided to take a step backward and
>concentrate on building a high speed data radio. Although we have
>ideas for analog use of DS Spread Spectrum (as a sort of time domain
>linear transponder), we have decided that most of the SS radio design
>difficulties can be addressed with the design of a data radio.

<snip>

>Thoughts?

Good news, Jake!

If you need a real world beta-test area... :)

Take Care & 73

Marty Albert - marty@trucom.com
Amateur Radio: KC6UFM@KC6UFM.#SEMO.MO.USA.NOAM

*****
Interested in Amateur Radio?
http://www.trucom.com/ppages/marty
*****
HAMPS Coordinator
http://www.geocities.com/CapeCanaveral/Lab/7067
*****

```

## 162. RE: 1474] Re:Is SS The Solution For High Speed Packet

```

From: Gwyn Reedy <gwyn@paccomm.com>
Date: Fri, 30 May 1997 17:14:42 -0400
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BC6D1C.F86F8020@gwyn>
Rendered body type: text/plain

-----
From: Marty Albert[SMTP:marty@trucom.com] Said:

I would see more of a one-off approach... That's like the Paccomm version
of
the new GRAPES modems... From my best estimate, there is only about $80.00
worth of parts there (buying as needed vs bulk prices) and, as a rough
estimate, perhaps an hour of machine labor. The thing sells for $350.00.
The
only thing that the average Ham probably couldn't do is the 4 layer PCB.
Not
a big deal... Design it like the original GRAPES modem on multiple boards.
Just about anyone can do double sided boards.

I started to comment on this message before, but hit the send button
prematurely.

```

Disclaimers:

1. I favor hams doing design and group construction, etc.
2. I did not take Marty's comment about the cost of components as a 'dig.'

Why does \$80 of parts sell for \$349?

I just get worried that folk don't understand the basics of business economics, and while I'm here putting in 60 hours a week for about \$10 per hour folks reading your message will think I'm getting rich from overpricing the products.

The actual parts cost is about \$110 (remember case, etc.)

Then there is royalty to the designer (WA4DSY)

Labor for purchasing, receiving, assembly, test, and shipping (more like 5 or more hours labor, not one)

Overhead - sales, engineering, rent, insurance, taxes, utilities, advertising, warranty, etc. You wouldn't believe the tax and insurance cost for the workforce.

Profit - maybe one of these days!

My rule of thumb is to take parts cost and multiply by 3 to get amateur retail price. Sometimes you can do a little better, sometimes worse.

Like I said - I don't feel threatened by 'do it yourself' projects, but it must be a labor of love, because for all the nights and weekends spent doing it oneself, one could work part-time at a 7-11 for an equivalent amount of time and just buy the finished product.

Guess I should have been an economics teacher.

Gwyn Reedy, W1BEL

PacComm Packet Radio Systems

gwyn@paccomm.com

http://www.paccomm.com

```
begin 600 WINMAIL.DAT
M>)\^(BT5'0:0" ^$`~~~~~!`$`0>0!@`(`~~~Y 0`~~~~~#H`$(@ <`
M&`~~`$E032Y-:6-R;W-09G0@36%I;"Y.;W1E`#$(`0V !`~~~~~@`"~~`$S
MD 8`j`~~~~~$~~~~~P`~, (~~~~+~~\`~~~~~(!_P\!`~~~~~0`~~~~~
M`~"!*Q^DOJ,0&9UN`-T!#U0"~~~~~S0'1A<'(N;W)G`--5%`<W- =8%P
M<BY0<F<~~~~~@`$, $~~~~~%~~~~~4TU44`~~~~~>~~,P`0`~~~~~P`~!S<T!T
M87!R+F]R9P`#`!4,`0`~~~~~, _@&\&~~~~~@`!, $~~~~~.~~~~~)W-S0'1A<'(N
M;W)G)P`~~~~~(!`S !`~~~~~$0`~~~%--5% Z4U- 5$%04BY/4D<~~~~~P`~.0`~
M`~+`$ Z`0`~~~~~(!]@!~~~~~!`~~~~~(Y) $$$$ $`-@~~~~~)%B Q-#<T
M72!293I)<R!34R!4:8&4V]L=71I;VX@1F]R($AI9V@@4W!E960@4&%C:V5T
M`~\0`06`P`~.~~~~~S0<%`!X`$0`~."H`!0!%`0$@@`~,#@~~~~~,T`!0`>~~T`
M`0`0`4`..0$!`8`!`"$`~~~~~Q,T4X-C!%,34V1#9$,$$Q.$5!-# P-# P-3)&
M1D4U00`.,!P$#D 8`C @`~!0`~~~~~+`",~~~~~,)@`~~~~~"P`I`~~~~~#
M`"X`~~~~~,-@~~~~~0`Y`*"J DGT^;;P!`!@!P`~$~~~~~V`~~~~~4D4Z(#$T
M-S1=(%)E.DES(%-3%(1H92!3;VQU=&E0;B!&;W(@2&EG;"!3<&5E9"!086-K
M970`~~~~~"7$`~0`~~~~~!8`~~~~~!0&T^?80A8.@;UE81T(ZD`$ %+_Y:~~~~~>!X,
M`0`~~~~~,~~~~~!-4P`~@`?# $`~~~~~2`~~~~~5VEN9&]W<R]'=WEN+T=W>6X`~~~~~#
M`~80`8)J0,`!Q!-!@`~!@`($ $`~~~~~!E`~~~~~+2TM+2TM+2TM+4923TTZ34%2
M5%E!3$)%4E133510.DU!4E190%1254-/34-/35-!240225=/54Q$4T5%34]2
M14]&04].12U/1D9!4%!23T%#2%1(05133$E+151(15! !0T-/30`~~~~~"0D0
M`0`~`~.<&`~#C!`~!1PL`~$Q:1G4$V-;I_P`~*`0`%"0*D`^0%ZP*#`% 3`U0`
M`&-H"L!S971N,@`~!L,"@S(/?Q`",^,#Q0(<`<')Q$B '$P*#EC0#QA68-19/
M9C840*$&L`-T96T"@`T*@(L(SPG9.QK?,C4U`H`'"H$-L0M@;F<Q,`.#.%* +
M`VQI,3@P`M`@:2TQ-#0-\ S0'T.M"UDQ&) 50&\9L&,%0,XM(6<*BQZ@,S8?
M[@PP]2#F1@-A.@KA(!\A(@R"DP70"L!T>16 ;&($D(!T6U--5% Z`, A)0%
M=)`U!;!M+ETH05T+1A2B# %C`$ @XRH@!A!I9#H*APMD%V)`# $@Y@J%22!W
M`&!L9&0@?`!E( 10&N @&$]F(&$M\&YE+9LN`"X1<`#A`-!H+B]09"!4$<!T
M)P0@`J!K:2V0=&@MD%`T`B!;?P@=@20`) "(WQ"H4P4H,N8 ?@1U)!4$4%
M\DS8FUS+U(DLBV@)Q G4)T9H" T00=P+![E+#!"JRW1!`N06PG$ &@`% &
M0`HD`M`N`N`*A2T0`"!H&RWR"K%T!" U)"AB=?IY`X!G+B $("Y@`8` )@&<Q
M`~0@`.)!L:S>P!1!CY0>0*2X@;F0U`#D!+C"Q`V!U9V@*A32(< 20[1` <#L!
M`Z!H`&$M\@#`WF@`@`V0`V`&X'(O<C R<SC"$? !L; 00`A`%P`3\,S4V@CZC
M`H4ULS\$,%,++[ P0V$Q$6%G+9!(]F$P`"#A8@&@-=$%H" TQ9&XG!4!D;S5R
M,%(T33Y!>020,(!#0B]P3N<A`J%+C!B:3C@#; '0-T04D0`D$:0`Z!I!4 P
M!`~\%L$:0`X`'0`*`+D$MH"TP_S2@`"U MD ;@`Q$S8`(/`^>Y*YU*=311-@0`
M<`DN4>]#L .11%$4`4`8`V0`)#?.6)*GPLH*8E095]2SU/?_U305>U0;RE<
M+/ 9H";A.7`^=$1@,(),\ 5 ,6$`_00@_0>!<T*R)U _P33Q.) %0/\`^`$(4
M$? ZL`NB68`#H!5 ;QG +[ (<#]P>4KV505$000`8PMA!X 1X`J6,2]P_2SA
M9D)P!;$1P#-01$XPK<-L$=C.J$@`< (8`!#L;\`@"A2-* "(#4`$@!C+W#M
```

M504R+W L\&0J<#)0(0#], \$!A,"\$FTR\_16;8V!#!2[P6@-%\$N`2B!<"Y1`C [ M`44[ `B=D<&<N)UW\5\_YH)Q!\$4 >1-F\$WB#]B/[78-#D\_7?PL\&I-HD+ \_P5 M-S\$(@5EA0?("\$#GQ1%#]1!)U.K Q(0&07)\$P4D-@\_0"08S61+A XD "0+F \$ M\$;L%D62P;7 1.M%<D7<^`-E\*84DG,/ U,W!<T3C"W0N ("`/4,[`G<)X#H` M\_S`"-@4>`#R2/41N0@0&N#^861P.-%.8#UQ6K8#\&LA\_S\`.@!R8FTQ<R,Z M,3=P`U\*`+? Q\$3HB0:1RT0-@9&+A\_TKG504^P@#078!(T3? \$9N/W-8%TYG51 M\*%U!<& G44ZA>Q`P8T0I>]A:0C5%`V!Y/P= )P%9@3!2871%02A7H\$ \$T1%-9 M?9,/F+;/[-R\`(1L7"A9S4`&N#Y.E!I=H2C.0`1\ ;0-=!W-0\$T07&D<SX` M+N XPBC[+; ,P`S5(82VD<]0^4S4`]V2R+E%\_QD\Q\$3!@=I A4/\M8 = !Y!C M01W@/A\$&<82]P(P-0`+@`,`(< !P.E U`?QA>(MB-C #\$\$\$>P")!QDNYD,1\$T MH(24=PK C1\$G`'UC15D(8"T\$1!(G4!Z@9?\Q\$#!#C8%ATXS79M0\_PC!2W3<Q M:S\_! .E!CEU #8!\0^R%!/ <%Y)U N0BWR,%\$1\+-\$0\$4@<R\$L=E;U32<0]RA@ M2F&6,W4&T\$1S0;%E`M]\^6`B2@4T\$2<0,UER;3+\_0P`TT3UQ&N !D ,1.B,0 M<Y3`W 2`=`S=0%.IBXPCB`>=\$IB>,\$\$D#4`<YUW-S`[\$\$?]=[4PP\$ECA\*F&+ M`611\_6ZC9@G@=\_ )V<1FP+F!/T3\G\$&A@1&\$%0` ;R/V%F)\_U#(FHA(7&16[ ]' ML4H`-`%`\_E<&>L8.C+@;\$:<# \$06Y\$D`YA3: MD`2C=^,R04:0:/]GXG`2=&%< M@6KA/\*!`6\$4\_T>Q+E&DXC4`3G.M(Y/B-[/.+9VB+B!-P2 W`S J\$.-THP.@ M97%UA3"+0682\_P10;O!G\$ZTD7)%LXSB1,\$-\$`Q #` (;@.7%ZU6.7505`\_PI0 M!%8X3U1+4\$1P)&!)U!\_@&&N4G\$FAC\$0(0207>U`-'=Y`Z!2.4&\$5<Q^\$)% M3)26`- (4##A,)&!, "%0%)VD41@&81S7?SZ9[<!0%<@,+,HLE;UJ5! =' Z M+R]WO/ N7[MOEQU7:U`L&@\$`P6 ``P`0\$ ``````#`!\$0`````\$ ``!S#@&0 H M&VV\`4 ``##@&0 H&VV\`1X`/0`!````!0````%)%.B ``````P`--/TW``#? !RVV\` , end

### 163. Re: [SS:1488] Re: Is SS The Solution For High Speed Packet

From: Frank & Sue Perkins <fperkins@OnRamp.NET>  
Date: Sat, 31 May 1997 09:48:27 -0500  
To: ss@tapr.org  
Message-ID: <33903A3B.53D7@mailhost.onramp.net>  
Rendered body type: text/plain

Phil Karn wrote:  
>  
> >Don't the CDMA cell phones use a variable speed vocoder and run at maximum  
> >9600 bit/sec?  
>  
> Originally, yes. Many carriers wanted better voice quality, so we  
> implemented "Rate Set 2", where the four frame sizes are each  
> increased by 50%. I.e., the peak data rate is now 14.4 kb/s, minus  
> overhead. This is comparable to the (fixed) 13kb/s rate of the GSM  
> vocoder, though we still win by having a variable rate.  
>  
> BTW, Rate Set 2 was implemented by simply increasing the FEC  
> convolutional code rates, e.g., from rate 1/2 to 3/4 on the forward  
> link. The symbol and chip rates remain the same.  
>  
> Phil

I had lunch with Kent WA5VJB Thursday. He brought in his Qualcomm PCS phone for a listen. Very good quality voice ... inside with low "S-meter" indication. This digital stuff works. Time to get this into amateur projects. We have a team of 4 guys in Dallas doing a spread design now ... not much e-mail, just the real thing.

Frank WB5IPM

### 164. Re: [SS:1495] Re: Is SS The Solution For High Speed Packet

From: Dino Darling <dinod@deltanet.com>  
Date: Sat, 31 May 1997 10:01:59 -0700  
To: ss@tapr.org  
Message-ID: <3.0.1.32.19970531100159.006c799c@mail.deltanet.com>  
Rendered body type: text/plain

At 09:56 AM 5/31/97 -0500, Frank wrote:  
>I had lunch with Kent WA5VJB Thursday. He brought in his Qualcomm PCS  
>phone for a listen. Very good quality voice ... inside with low  
>"S-meter" indication. This digital stuff works. Time to get this into  
>amateur projects. We have a team of 4 guys in Dallas doing a spread  
>design now ... not much e-mail, just the real thing.  
>  
>Frank WB5IPM

Thanks Frank! Keep us posted! You Texas guys always have to be first...:-)

Dino...dinod@deltanet.com

"A REAL friend stabs you in the FRONT!"

---

## 165. Re: SS

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Sat, 31 May 1997 22:42:08 -0500  
To: " AMSAT BB Mail Group " <amsat-bb@amsat.org>  
Cc: MOON-NET@VM.STLAWU.EDU, "David G.L. Anderson" <david@BRAESIDE.DEMON.CO.UK>,  
Clifford Buttschardt <cbuttsch@slonet.org>,  
" Spread Spectrum " <ss@tapr.org>  
Message-ID: <v0302090aafb697833ff9@208.134.134.40>  
Rendered body type: text/plain

Then again maybe not.

Based on the message I can't see any evidence to say that it is Spread Spectrum communications or not. I would be interested in seeing the data captured, maybe David can put it on a web site or something to retrieve. Possibly our friendly military users in the UK are just using a wide-band 'spread', higher-power communications technique of some sort which may or may not be Spread Spectrum communications. Then again they might just be running 100,000 watts as well. Which wouldn't make it a good example of what amateur radio would want to or could implement.

As to the issue of taking it. If they are the military -- you probably have to.

I wouldn't base the condemnation of an entire amateur mode on what the military does with technology. Before long you will have SS on amateur satellites, so let's not kill the mode just yet.

Then in regards to the weak signal issues, if you read the stuff TAPR has been publishing, TAPR plans on implementing systems that stay off the 'by agreement' weak signal areas. In most cases we are talking about very small segments of the bands and typically at one end or the other. It isn't hard at all to stay off them. However, where the disagreement for the most comes in the US is that some want these issues written into the rules and not just agreed upon. FCC Docket 97-12 is currently in the reply comments stage. What we (the US amateur community) receive from the FCC in the next year or two on the SS rule making will influence what is created, experimented with, and eventually becomes available for the next decade or more in our radio community. If you want to see the comments filed in May, check <http://www.tapr.org/ss>. Reply comment deadline is coming very quick.

As to the 'first' concrete evidence of interference due to spread spectrum communications -- there are plenty of poorly designed, badly implemented systems and plenty of military systems to look at and show problems with for the last twenty years. I wouldn't call this a first example. Almost all the Part 15 stuff having only a little above 10db process gain is a good place to start looking in some implementations. Look at what your cordless phone on 900Mhz looks like. If this is really a Spread Spectrum signal (not just a spread signal) then it wouldn't be the first military or commercial implementation that does what you think it is doing. The difference is that amateurs can implement the mode correctly, because we don't plan on selling it to 30 million consumers. Amateurs can stay off of agreed upon areas. We can't ban or drastically limit amateur radio experimentation and development because we can point to existing poor designs. In the political/legal climate of today's amateur radio -- it wouldn't surprise me if SSB was a new mode then someone would comment that it needed to have a CW ID ;-) ;) (just kidding.)

The mode of Spread Spectrum is all about the art of continuing experimentation and innovations within the amateur radio community. If we stop amateur radio from developing and implementing new modes of operations to protect small communities within the population, then we might as well expect things like what was proposed by the CBO (Congressional Budget Office) two weeks ago -- assign various bands including the US amateur radio segments to a management group to determine its best utilization. Something to think about before we start limiting experimentation and development within the hobby.

Please let's be a little more scientific about these things and a little less emotional.

Cheers - Greg, WD5IVD

>Clifford Buttschardt <cbuttsch@slonet.org> wrote on AMSAT-BB list:  
>

```

>David. This is the first example of concrete interference due to spread
>spectrum. Knowing your acumen at the VHF's I do hope that we pay
>attention and ask further questions about this matter! Cliff K7RR
>
>
>On Sat, 31 May 1997, David G.L. Anderson wrote on AMSAT-BB list:
>
>> The SS problem is already here in the UK on 70cms (as pointed out by John
>> GM4IHJ), not by amateurs but another 'user'. I have 10dB of white noise
>> right across the 430-440MHz band and beyond on a certain beam heading.
>> Note this is not amateur SS but government/military SS.
>>
>> Spectrum analysis plots are available to anyone interested.(I don't think I
>> am giving away any secrets to show what looks like white noise). If the
>> intention was to make these transmissions undetectable then they chose the
>> wrong frequency band! - Just as the Soviets did with their Killer
>> Satellites a few years ago when they 'hid' them on 2 metres.
>>
>> As well as opposing possible future wideband SS Amateur pollution in the
>> weak signal parts of the bands, we should all be pushing our Radio
>> Societies to complain about the EXISTING degradation of the weak signal
>> sections of one of our primary UHF bands by non-amateur SS before we find
>> that we have no weak signals to hear.
>>
>> Or do we just lie back and take it?
>>
>> 73
>>
>>
>>
>>
>>
>> +-----+
>> | David Anderson GM4JJJ | <http://www.braeside.demon.co.uk>
>> | gm4jjj@amsat.org |
>> +-----+
>>

```

```

-----
Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

```

## 166. Re: SS (fwd)

```

From: Bob Nielsen <nielsen@primenet.com>
Date: Sat, 31 May 1997 20:58:38 -0700 (MST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.96.970531205610.254B-100000@nielsen.tus.primenet.com>
Rendered body type: text/plain

```

This showed up on amsat-bb and might be of interest to those on this list.

Bob

```

-----
Bob Nielsen          Internet: nielsen@primenet.com
Tucson, AZ          AMPRnet: w6swe@w6swe.ampr.org
                     AX.25: w6swe@wb7tts.az.usa.noam
                     http://www.primenet.com/~nielsen

```

```

----- Forwarded message -----
Date: Sat, 31 May 1997 18:17:08 -0700 (PDT)
From: Clifford Buttschardt <cbuttsch@slonet.org>
To: "David G.L. Anderson" <david@BRAESIDE.DEMON.CO.UK>
Cc: MOON-NET@VM.STLAWU.EDU, amsat-bb@amsat.org
Subject: Re: SS

```

David. This is the first example of concrete interference due to spread spectrum. Knowing your acumen at the VHF's I do hope that we pay attention and ask further questions about this matter! Cliff K7RR

On Sat, 31 May 1997, David G.L. Anderson wrote:



```

> The SS problem is already here in the UK on 70cms (as pointed out by John
> GM4IHJ), not by amateurs but another 'user'. I have 10dB of white noise
> right across the 430-440MHz band and beyond on a certain beam heading.
> Note this is not amateur SS but government/military SS.
>
> Spectrum analysis plots are available to anyone interested.(I don't think I
> am giving away any secrets to show what looks like white noise). If the
> intention was to make these transmissions undetectable then they chose the
> wrong frequency band! - Just as the Soviets did with their Killer
> Satellites a few years ago when they 'hid' them on 2 metres.
>
> As well as opposing possible future wideband SS Amateur pollution in the
> weak signal parts of the bands, we should all be pushing our Radio
> Societies to complain about the EXISTING degradation of the weak signal
> sections of one of our primary UHF bands by non-amateur SS before we find
> that we have no weak signals to hear.
>
> Or do we just lie back and take it?
>
> 73
>
>
>
>
>
>
>
> +-----+
> | David Anderson GM4JJJ      |      <http://www.braeside.demon.co.uk>
> |   gm4jjj@amsat.org        |
> +-----+
>

```

---

## June 1997

Original source file: ss.9706

Source: [http://ftp.tapr.org/tapr\\_history/SIG\\_Archives/spread-spectrum-sig/mail\\_archive/ss.9706](http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9706)

**1. Re: [SS:1497] Re: SS**

From: Bob Nielsen <nielsen@primenet.com>  
Date: Sat, 31 May 1997 21:56:16 -0700 (MST)  
To: ss@tapr.org  
Message-ID: <Pine.LNX.3.96.970531215304.368B-100000@nielsen.tus.primenet.com>  
Rendered body type: text/plain

On Sat, 31 May 1997, Greg Jones, WD5IVD wrote:

```
> Then again maybe not.
>
> Based on the message I can't see any evidence to say that it is Spread
> Spectrum communications or not. I would be interested in seeing the data
> captured, maybe David can put it on a web site or something to retrieve.
> Possibly our friendly military users in the UK are just using a wide-band
> 'spread', higher-power communications technique of some sort which may or
> may not be Spread Spectrum communications. Then again they might just be
> running 100,000 watts as well. Which wouldn't make it a good example of
> what amateur radio would want to or could implement.
>
> As to the issue of taking it. If they are the military -- you probably
> have to.
```

We had a situation here on 440 a few years ago where the background noise went up enough that all the local repeaters were desensed severely. Although nothing was ever admitted, there were a few EC-130s at the local airforce base....

After some phone calls, it mysteriously disappeared. Just because it appears to be white noise doesn't mean it is necessarily SS.

Bob

-----  
 Bob Nielsen                   Internet: nielsen@primenet.com  
 Tucson, AZ                   AMPRnet: w6swe@w6swe.ampr.org  
                               AX.25: w6swe@wb7tts.az.usa.noam  
                               http://www.primenet.com/~nielsen

## 2. Re: SS

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Sun, 1 Jun 1997 01:29:51 -0500  
To: ss@tapr.org  
Cc: " AMSAT BB Mail Group" <amsat-bb@amsat.org>  
Message-ID: <v03020911afb6c438c3b6@[208.134.134.40]>  
Rendered body type: text/plain

Hi Bob.

Good example.

There is a EC-130 or equivalent that flies along the border of Texas looking for drug smugglers. There are times when they switch over to the 440 amateur band (including spectrum above and below) and their system takes out the entire TexNet network starting at Austin going South (that is a lot of area). If the band is open when they are operating in the 440 band, we have seen it take out the entire network in Texas and into Southern Oklahoma. The 'signal' or whatever they are doing is not enough to get into most repeaters, but it is enough that the 9600 baud modems have a heck of a time handling it and most of the time just can't train on each other when the airborne signal is operating.

Sounds like maybe the same military style system you have seen.

As you say, just because it is wide band, it doesn't mean that the system in use is Spread Spectrum.

Cheers - Greg, WD5IVD

```
>On Sat, 31 May 1997, Bob Nielsen, W6SWE wrote:
>
>> Then again maybe not.
```

>>  
>> Based on the message I can't see any evidence to say that it is Spread  
>> Spectrum communications or not. I would be interested in seeing the data  
>> captured, maybe David can put it on a web site or something to retrieve.  
>> Possibly our friendly military users in the UK are just using a wide-band  
>> 'spread', higher-power communications technique of some sort which may or  
>> may not be Spread Spectrum communications. Then again they might just be  
>> running 100,000 watts as well. Which wouldn't make it a good example of  
>> what amateur radio would want to or could implement.  
>>  
>> As to the issue of taking it. If they are the military -- you probably  
>> have to.  
>  
>We had a situation here on 440 a few years ago where the background noise  
>went up enough that all the local repeaters were desensed severely.  
>Although nothing was ever admitted, there were a few EC-130s at the local  
>airforce base....  
>  
>After some phone calls, it mysteriously disappeared. Just because it  
>appears to be white noise doesn't mean it is necessarily SS.  
>  
>Bob  
>  
>-----  
>Bob Nielsen Internet: nielsen@primenet.com  
>Tucson, AZ AMPRnet: w6swe@w6swe.ampr.org  
> AX.25: w6swe@wb7tls.az.usa.noam  
> http://www.primenet.com/~nielsen  
  
>-----  
>Greg Jones, WD5IVD  
>Austin, Texas  
>wd5ivd@tapr.org  
>http://www.tapr.org/~wd5ivd  
>-----

### 3. Re: SS

From: "David G.L. Anderson" <david@braeside.demon.co.uk>  
Date: Sun, 1 Jun 1997 10:46:13 +0100  
To: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>,  
AMSAT BB Mail Group <amsat-bb@amsat.org>  
Cc: MOON-NET@vm.stlawu.edu, Clifford Buttschardt <cbuttsch@slonet.org>,  
Spread Spectrum <ss@tapr.org>  
Message-ID: <v0310280eafb6f254451f@[158.152.181.53]>  
Rendered body type: text/plain  
  
At 4:42 am +0100 1/6/97, Greg Jones, WD5IVD wrote:  
>Then again maybe not.  
>  
>Based on the message I can't see any evidence to say that it is Spread  
>Spectrum communications or not. I would be interested in seeing the data  
>captured, maybe David can put it on a web site or something to retrieve.  
>Possibly our friendly military users in the UK are just using a wide-band  
>'spread', higher-power communications technique of some sort which may or  
>may not be Spread Spectrum communications. Then again they might just be  
>running 100,000 watts as well. Which wouldn't make it a good example of  
>what amateur radio would want to or could implement.  
  
No, I wasn't arguing for or against WB amateur SS experimentation in  
appropriate parts of non-weak signal amateur bands. Narrow SS for EME is  
fine by me (No greater than SSB voice bandwidths).  
  
I have the Spectrum analyser plots on paper here, but will attempt to scan  
them in and put them on my web page in the near future.  
>  
>As to the issue of taking it. If they are the military -- you probably  
>have to.  
  
That's for sure, but then maybe its commercial? - that's part of the  
trouble there is no way with this SS to determine who is transmitting it.  
  
- Snip-  
In the political/legal climate of todays amateur radio -- it  
>wouldn't surprise me if SSB was a new mode then someone would comment that  
>it needed to have a CW ID ;-) ;-) (just kidding.)  
  
Hey, in the UK we still have to use a CW ID on AX.25 Packet Radio :-)

>  
>The mode of Spread Spectrum is all about the art of continuing  
>experimentation and innovations within the amateur radio community. If we  
>stop amateur radio from developing and implementing new modes of operations  
>to protect small communities within the population, then we might as well  
>expect things like what was proposed by the CBO (Congressional Budget  
>Office) two weeks ago -- assign various bands including the US amateur  
>radio segments to a management group to determine its best utilization.  
>Something to think about before we start limiting experimentation and  
>development within the hobby.

Not my intention to stop experimentation at all, just stating the hard facts of the QRM problem that we suffer at present on 430-440MHz. Which although is local to the UK, may even affect satellites (as PAVE-PAWS radar does).

>Please let's be a little more scientific about these things and a little  
>less emotional.

If you want the scientific evidence, I will be happy to post you the Spectrum Analyser plots... Its hard to be unemotional about this QRM.

```
+-----+
| David Anderson GM4JJJ      |      <http://www.braeside.demon.co.uk>
| gm4jjj@amsat.org          |
+-----+
```

---

#### 4. Re: SS

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Sun, 1 Jun 1997 05:37:09 -0500  
To: "David G.L. Anderson" <david@braeside.demon.co.uk>,  
AMSAT BB Mail Group <amsat-bb@amsat.org>  
Cc: MOON-NET@vm.stlawu.edu, Clifford Buttschardt <cbuttsch@slonet.org>,  
Spread Spectrum <ss@tapr.org>  
Message-ID: <v03020917afb6fc42f1f5@[208.134.134.40]>  
Rendered body type: text/plain

At 4:46 AM -0500 6/1/97, David G.L. Anderson wrote:  
>At 4:42 am +0100 1/6/97, Greg Jones, WD5IVD wrote:  
>>Then again maybe not.  
>>  
>  
<snip>  
>  
>No, I wasn't arguing for or against WB amateur SS experimentation in  
>appropriate parts of non-weak signal amateur bands. Narrow SS for EME is  
>fine by me( No greater than SSB voice bandwidths).  
>  
<snip>  
>  
>

Sounds like we are in agreement on a lot of this David. From your message it does sound like you have a problem. I was really answering Cliff's retort about how bad your 'Spread Spectrum' transmission problem was and how it was a great first example. Cliff was making a point regarding the 'for or against amateur radio SS'. I felt that message needed a response.  
>From this last message, sounds like it might be time to get the DF equipment out and find where the source is.

Personally, I think we (amateur radio) have greater interference potential from other services outside amateur radio that are secondary on freqs we use. It just seems that within the amateur community at times we shoot at each other instead of taking proper aim together at possibly more important issues.

On another topic, I sure wish someone could explain what is meant by 'narrow' spread spectrum ? I saw this in some of the comments filed on FCC Docket 97-12.

The whole purpose is to spread the signal out in such a manner as to increase the process gain and therefore reduce the potential for interference by decreasing the power spectral density (PSD) of the transmission across a selected spectrum. If you attempt to restrict the transmission to some 'narrow' operating limit you seriously increase the

potential for interference, since the PSD is now focused in a much smaller, tighter area.

Spreading over 3khz doesn't do much good -- does it ? Maybe there is a benefit I haven't thought about on this -- Phil (KA9Q), Tom (W3IWI) ? I probably need to go back and read the paper on SS EME from the CSHVF conference last year.

Cheers - Greg, WD5IVD

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>  
-----

---

## 5. unsubscribe

From: Guillaume <guillaume@worldonline.nl>  
Date: Sun, 01 Jun 1997 14:15:11 +0200  
To: ss@tapr.org  
Message-ID: <3.0.1.32.19970601141511.006a3ba8@worldonline.nl>  
Rendered body type: text/plain  
[Empty message body]

---

## 6. unsubscribe

From: arutz@shfmicro.com (alan rutz)  
Date: Sun, 1 Jun 1997 10:27:58 -0500  
To: ss@tapr.org  
Message-ID: <199706011527.KAA07696@alice.adsnet.com>  
Rendered body type: text/plain  
[Empty message body]

---

## 7. Re: SS

From: Arthur H Feller <kb4zj@amsat.org>  
Date: Sun, 1 Jun 1997 16:20:59 -0400 (EDT)  
To: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>, ss@tapr.org  
Cc: amsat-bb@amsat.org  
Message-ID: <199706012020.QAA05129@smtp2.erols.com>  
Rendered body type: text/plain

Hi, Greg,

What you're hearing is probably a radar system.

Note that the primary allocation in the band 420-450 MHz is to the radiolocation service. The amateur service is secondary with the amateur-satellite service made available by a footnote in the band 435-438 MHz. See the Radio Regulations, Chapter 8.

Domestically, the radiolocation service falls on the Government side of the table of frequency allocations. See 47 CFR 2.106 which is available from the best reference librarians.

Since the amateur service and amateur-satellite service are allocated on a secondary basis, we MUST accept (cannot complain about) interference from the radiolocation service.

Can we think of neat ways to deal with the interference? That's the challenge.

73, art.....

---

## 8. [SS:1502] unsubscribe

From: "Timmy A. Lindamood" <tlindamood@theriver.com>  
Date: Sun, 1 Jun 1997 21:01:42 -0700  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <01BC6ED0.5C5EC960@p5.pm6.theriver.com>  
Rendered body type: text/plain  
[Empty message body]

---

## 9. unsubscribe

From: Richard Stocking <stocking@nps.navy.mil>  
Date: Mon, 02 Jun 1997 10:00:58 -0700  
To: ss@tapr.org

\\ \\ \\ \\ \\ \\ \\

The diagram shows a 100-pin connector with a 10-pin header and a 90-pin D-sub connector. The header pins are labeled as follows:

- Pin 1: N70P
- Pin 2: EX-AB5PU
- Pin 3: EX-WB0DPI
- Pin 4: (blank)
- Pin 5: (blank)
- Pin 6: (blank)
- Pin 7: (blank)
- Pin 8: (blank)
- Pin 9: (blank)
- Pin 10: (blank)

From: cberg@grayfox.svs.com  
Date: Mon, 2 Jun 97 15:18:57 PDT  
To: ss@tapr.org  
Message-ID: <Chameleon.970602151956.cberg@napcom.svs.com>  
Rendered body type: text/plain  
[Empty message body]

---

## 15. Unsubscribe messages

From: Bob Nielsen <nielsen@primenet.com>  
Date: Mon, 2 Jun 1997 15:24:52 -0700 (MST)  
To: ss@tapr.org  
Message-ID: <Pine.LNX.3.96.970602152037.271A-100000@nielsen.tus.primenet.com>  
Rendered body type: text/plain

The only way to get off this list (other than really ticking off the list manager) is to send the following in a message to "listproc@tapr.org" (NOT to the list itself.)

unsubscribe ss

or

signoff ss

73, Bob

-----  
Bob Nielsen                      Internet: nielsen@primenet.com  
Tucson, AZ                      AMPRnet: w6swe@w6swe.ampr.org  
                                 AX.25: w6swe@wb7tts.az.usa.noam  
                                 http://www.primenet.com/~nielsen

---

## 16. Re: [SS:1490] Data Radio Design

From: Phil Karn <karn@qualcomm.com>  
Date: Mon, 2 Jun 1997 21:52:27 -0700 (PDT)  
To: frussle@erols.com (Jake Brodsky)  
Cc: ss@tapr.org  
Message-ID: <199706030452.VAA05562@servo.qualcomm.com>  
Rendered body type: text/plain

>Three issues are cropping up: First, can anyone give us a reference  
>on how critical the 90 degree phase shift is? I ask this because with  
>higher data rates it is more and more difficult to maintain an  
>accurate 90 degree phase shift across the entire band width. =20

I don't understand how this should be a problem. A typical QPSK (4-state QAM) modem generates a quadrature IF carrier reference for its pair of balanced modulators by running the LO at four times the IF carrier frequency and feeding it to a series of flip-flop dividers that give you a perfect quadrature carrier (0 and 90 degree points) at the nominal IF carrier frequency. Then you modulate, combine and translate to the desired RF carrier frequency.

Even if you tune the transmitter by changing the IF carrier frequency, the dividers will maintain perfect quadrature. It's better, though, to leave the IF carrier fixed and vary the conversion LOs that follow. That makes it easier to bandpass filter the output of the mixers to block harmonics and images, although the bulk of the spectral control filtering should be done on the baseband I & Q signals before they reach the balanced mixers.

>Second, what kind of transmit harmonic filters can we use? Can I use  
>a third or fifth order Butterworth filter without too much concern

Even good RF harmonic filters should have a gentle enough group delay in the desired passband to not cause any trouble.

>the receiver? How about data rate filters? Or, as an alternative,

If by 'data rate filters' you mean the filters that actually establish the bandwidth of the signal, as I said before these should be implemented at baseband as lowpass filters.

>Third, for the eventual day when we use this platform for QAM spread  
>spectrum, does anyone have suggestions for doing a Hilbert transform

Why do you need a Hilbert transform? The usual way to do QPSK spreading is to just use two different PN sequences, one for I and the other for Q. They should be synchronized to each other so their shift registers start

off in the same state.

Beware one important pitfall in QPSK spreading: unlike BPSK, QPSK signals are sensitive to spectral inversion. You have to watch that as you make your various up and down conversions in the transmitter and receiver.

Phil

---

## 17. Re: [SS:1491] Re: SS IF bandwidth

From: Phil Karn <karn@qualcomm.com>  
Date: Mon, 2 Jun 1997 21:54:58 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199706030454.VAA05566@servo.qualcomm.com>  
Rendered body type: text/plain

>out I am going to have to do a lot more study. The ARRL book has  
>been recommended to me as being a good place to start.

Roy,

While the ARRL Spread Spectrum Sourcebook is worth a look, it's getting rather dated now. Although the basic info about direct sequence, frequency hopping, etc, is still valid the book omits much that is now considered very important in the field of error control coding and automatic transmitter power control.

Phil

---

## 18. Re:Unsubscribe

From: HAVE TOOLS WILL TRAVEL <save@io.com>  
Date: Tue, 03 Jun 1997 15:56:49 +0000  
To: ss@tapr.org  
Message-ID: <33943EC1.431B@io.com>  
Rendered body type: text/plain

[Empty message body]

---

## 19. Re: SS

From: "David G.L. Anderson" <david@braeside.demon.co.uk>  
Date: Tue, 3 Jun 1997 21:46:19 +0100  
To: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>,  
AMSAT BB Mail Group <amsat-bb@amsat.org>  
Cc: MOON-NET@vm.stlawu.edu, Clifford Buttschardt <cbuttsch@slonet.org>,  
Spread Spectrum <ss@tapr.org>  
Message-ID: <v03102801afba329f6119@[158.152.181.53]>  
Rendered body type: text/plain

At 4:42 am +0100 1/6/97, Greg Jones, WD5IVD wrote:  
>Then again maybe not.  
>  
>Based on the message I can't see any evidence to say that it is Spread  
>Spectrum communications or not. I would be interested in seeing the data  
>captured, maybe David can put it on a web site or something to retrieve.

I have put the Spectrum Analyser plots on one of my web pages for anyone who is interested...

<http://www.braeside.demon.co.uk/SSQRM/432QRM.html>

73

```
+-----+
| David Anderson GM4JJJ      |      <http://www.braeside.demon.co.uk>
| gm4jjj@amsat.org          |
+-----+
```

---

## 20. Re: [SS:1515] Re: SS IF bandwidth

From: Don Hoffman <hoffman@Eng.Sun.COM>  
Date: Tue, 3 Jun 1997 14:28:24 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <Roam.SIMC.2.0.Beta.865373304.17131.hoffman@eng.sun.com>  
Rendered body type: text/plain

>From: "Phil Karn" <karn@qualcomm.com>  
>  
> While the ARRL Spread Spectrum Sourcebook is worth a look, it's



> getting rather dated now. Although the basic info about direct  
> sequence, frequency hopping, etc, is still valid the book omits much  
> that is now considered very important in the field of error control  
> coding and automatic transmitter power control.  
>  
> Phil  
>

Just having just bought the Sourcebook, I agree. It was good background for someone like me coming to this new, but some more up-to-date info would be good. (If one read background information this old in my area (networking support for QoS) one would still think ATM was a good idea :-))

Any recommendations for more recent survey articles/books in this area?

Don Hoffman

---

## 21. Re: [SS:1515] Re: SS IF bandwidth

From: Andre Kesteloot <akestel@mrj.com>  
Date: Tue, 3 Jun 1997 20:21:53 -0400 (EDT)  
To: ss@tapr.org  
Cc: taco <tacos@amrad.org>  
Message-ID: <Pine.SUN.3.91.970603201538.27326A-100000@flash.mrj.com>  
Rendered body type: text/plain

Phil,

I admit that I am probably biased :-) but the ARRL SpreadSpectrum Sourcebook may be worth a little more than just "a look". It is still the only book that ever gave actual schematics on how to build something that worked, and that without any fancy ICs unavailable to the common person.

Incidentally, 10,000 copies of the book have been sold so far.

Please don't be too disdainful of our early efforts. We all had to start somewhere.

73

Andre Kesteloot N4ICK

On Tue, 3 Jun 1997, Phil Karn wrote:

> Roy,  
>  
> While the ARRL Spread Spectrum Sourcebook is worth a look, it's  
> getting rather dated now. Although the basic info about direct  
> sequence, frequency hopping, etc, is still valid the book omits much  
> that is now considered very important in the field of error control  
> coding and automatic transmitter power control.  
>  
> Phil  
>  
>

---

## 22. Re: [SS:1516] Re:Unsubscribe

From: Don Labriola <labriola@ix.netcom.com>  
Date: Tue, 03 Jun 1997 19:59:12 -0700  
To: ss@tapr.org  
Message-ID: <3394DA00.64A8@ix.netcom.com>  
Rendered body type: text/plain

>From my initial subscription:  
73's de W6QS - Don Labriola

To unsubscribe from this mailing list send a message to  
'listserv@tapr.org'  
with the following line in the body of the message:

signoff ss

---

## 23. Biased

From: "Frank "Skip" Pratt" <fpratt@dayton.adroit.com>  
Date: Wed, 04 Jun 1997 08:17:27 -0400  
To: ss@tapr.org  
Message-ID: <33955CD7.68CB@dayton.adroit.com>

Rendered body type: text/plain

André,

I applaud your defense of the the SS Source Book. Building things that do not require 'fancy IC's' and spectrum analyzers is where ham radio will find the majority of its support and its cadre. The high end research documented on TAPR's special interest page is laudable and needs to be done; but at the same time we must ensure that we do not create an environment which will intimidate the majority of the people in the process.

Thanks for your contribution.

73

Skip Pratt N2FOE

---

## 24. Re: [SS:1280] Re: Reed Solomon source code

From: Bernie Doehner <bad@uhf.wireless.net>  
Date: Wed, 4 Jun 1997 13:46:31 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <Pine.BSF.3.95.970604133857.293C-100000@uhf.wdc.net>  
Rendered body type: text/plain

On Mon, 21 Apr 1997, RLANIER wrote:

```
> Hi Bernie,  
>  
> I would really like to see what you come up with. I am very interested  
> in FEC codes, especially applying them to an SS radio project.  
>  
> Let me know what you come up with!  
>  
> Tony KE4AT0
```

Hi Tony/others:

Just cleaning up old mail and noticed this one. I have finished my brief (ever so brief/quick) overview of Block, Convolutional, and Reed-Solomon coding, and Viterbi Decoding. It's located at:

<http://bugs.wpi.edu:8080/EE535/hwk97/hwk4cd97/bad/bad.html>

You can also find a brief description of Trellis coding (my previous project) at:

<http://bugs.wpi.edu:8080/EE535/hwk97/hwk3cd97/bad/bad.html>

(note: <http://bugs.wpi.edu:8080/EE535> is the document root of a "virtual" telecom textbook - for which I and other students who took part in this class wrote different chapters).

Hope it's useful to someone.

73

Bernie nuls

---

## 25. UNSUBSCRIBE

From: Delco User <makoors@koame001.delcoelect.com>  
Date: Wed, 4 Jun 1997 12:55:48 -0500  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <01BC70E6.A1456580@kocepc2e.delcoelect.com>  
Rendered body type: text/plain

[Empty message body]

---

## 26. Re: SS IF bandwidth

From: hoelzen@trib.com  
Date: Wed, 4 Jun 1997 17:05:26 -0600  
To: ss@tapr.org  
Message-ID: <199706042305.RAA19650@rama.trib.com>  
Rendered body type: text/plain

At 11:42 AM 5/23/97 -0500, you wrote:

```
>SS Experts:  
>
```

>I have been trying to understand how a spread spectrum signal is received.  
>I have been wondering what is the best kind of IF amplifier for SS.

First you have 2 SS formats, DS and hopping. If you are thinking of the hopping signal you may want an IF that works with the signal bandwidth, but if you are working with DS you will want a bandwidth of at least twice the DS clock rate. I won't try to explain DS and hopping here.

>  
>For example, assume that a data bit was sent by spreading it such that it  
>was sent at 8 different frequencies over the length of time required to send  
>that bit. It seems to me if a receiver were tuned to one of these  
>frequencies  
>that it would see a pulse appearing at random intervals. The optimum IF  
>response would be a pulse amplifier tuned such that it matched the  
>characteristics of the pulse. The bandwidth would have to be wide to  
>allow the pulse to pass through.  
>  
>But in a SS receiver the frequency the receiver is tuned to hops around to  
>follow the transmitted frequency. In this case, it seems to me that a narrow  
>IF bandwidth could be used if the signal coming to the IF was phase coherent  
>so that the ringing in the IF amplifier filters would continue to be  
>reinforced  
>by the signal feeding it. It also seems to me to be quite a trick to keep the  
>signal feeding the IF phase coherent as the frequency hops around.  
>  
>Most likely the SS receiver does not work the way I have envisioned above  
>but works in some manner I have not thought of.  
>

>If so, how does it work?

If you are using a hopping SS you can IF the system much like narrow band but if you are using say 2MHz DS spreading code the signal will have 90% of its energy spread over 4MHz and would require an IF of at least 4MHz to recover 90% of the energy distribution curve. A narrow band IF will filter out most of the transmitted signal energy.

>  
>73, Roy W7IDM, ex N5RG  
>  
>  
>

I hope this helps your understanding a bit.

>73, Chuck KC7BNC

---

## 27. SS Source book

From: hoelzen@trib.com  
Date: Wed, 4 Jun 1997 17:05:30 -0600  
To: ss@tapr.org  
Message-ID: <199706042305.RAA19654@rama.trib.com>  
Rendered body type: text/plain

At 07:28 AM 6/4/97 -0500, you wrote:

I have had the AARL SS Source Book, While I don't recommend building equipment based on its info it is a good book to start understanding SS with some designs that WILL make you think.

Chuck KC7BNC

73's  
>André,  
>  
>I applaud your defense of the the SS Source Book. Building things that  
>do not require 'fancy IC's" and spectrum analyzers is where ham radio  
>will find the majority of its support and its cadre. The high end  
>research documented on TAPR's special interest page is laudable and  
>needs to be done; but at the same time we must ensure that we do not

>create an environment which will intimidate the majority of the people  
>in the process.  
>  
>Thanks for your contribution.  
>  
>73  
>  
>Skip Pratt N2FOE  
>  
>  
>

---

## 28. my Reply Comments

From: "Robert A. Buaas" <buaas@wireless.net>  
Date: Wed, 4 Jun 1997 18:17:51 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199706050117.SAA00353@wireless.net>  
Rendered body type: text/plain

Before the  
Federal Communications Commission  
Washington, D. C. 20554

|                                  |   |                     |
|----------------------------------|---|---------------------|
| In the Matter of                 | ) | WT Docket No. 97-12 |
|                                  | ) |                     |
| Amendment of the Amateur Service | ) | RM-8737             |
| Rules to Provide For             | ) |                     |
| Greater Use of Spread            | ) |                     |
| Spectrum Communication           | ) |                     |
| Technologies                     | ) |                     |

To: The Commission

### REPLY COMMENTS OF

Robert A. Buaas, K6KGS  
10044 Adams Ave. #108  
Huntington Beach, CA 92646  
buaas@wireless.net

June 4, 1997

### INTRODUCTION

I listed my credentials in my Comments on this Proceeding, dated May 2, 1997. The most relevant of these is the fact that I am one of but a handful of PRACTITIONERS in the art and science of Spread Spectrum (SS) as it applies to the Amateur Service. Being the holder of the SS Special Temporary Authorization (STA) caused me to be the focus of those interested in moving forward. Over the years I received many, varied levels of inquiry. It became quite clear how limiting the current Rules are, and also how diverse are the levels of expertise and interest. SS is sufficiently complex that only a few stout experimenters were willing to invest the many hours required to build even the simplest SS systems. A common theme for each of us is that we all started at the very beginning, learning from simple modules, building on that learning until we arrived at a critical mass of elements that could be called a working system. Along this path was the gift of insight into SS's strengths (resistance to interference and multipath fading) as well as its weaknesses (complexity, wideband receivers, the near-far problem). Many of us came to conclude that SS systems resulted from special cases of more general digital codes, and that what we require is blanket authorization to pursue additional avenues whose many desirable properties are worth investigating and adopting.

I find it interesting that many commentators refer, in their remarks, to SS as experimental technology. The fact is quite the contrary; only in Amateur Radio is SS experimental!

### DISCUSSION

While I am pleased that the Commission has decided to consider new rulemaking on SS communication within the Amateur Radio Service (ARS),

after contemplating all the Comments in this Proceeding, I urge that the Commission step back and take the longest possible view into the future. The outcome of this Rule Making will impact Amateur Radio for the next 10-20 years.

I urge that the Commission grant additional weight to the Comments of those who speak from experience. Particularly, I wish to concur with and endorse (a) the Comments of Phil Karn KA9Q, for his willingness to be a light of experience in a sea of darkness, and for the courage in his Comments to advocate SS technology at HF; (b) the Reply Comments of Dick Bingham W7WKR for his pioneering work in very-low-power 80M DSSS; (c) the Reply Comments of Glenn Elmore N6GN, who eloquently shows that the concerns of current weak-signal enthusiasts are technically unfounded; (d) Greg Jones WD5IVD and Dewayne Hendricks WA8DZP of TAPR, for making SS an organizational priority, thereby making current commercial SS more widely available; and (e) the ARRL, for bringing this matter to the current forum.

In my opinion, the ARRL (as an organization) is illustrative of the lack of consensus among Amateurs. It has the pro-SS and the anti-SS factions, and the many other factions/interests that leave it at cross-purposes with the initiative that is the subject of this Proceeding. The ARRL has neither contributed to nor provided leadership in this matter. As for policy, it wishes to see, predominately that the status quo remain in place, since this position best serves the ARRL as a power broker. All the while, technology is advancing, leaving the current practices in Amateur Radio behind. It's one thing to "say" you are "for something," and very much another to give it life by contributing time and resources. I have little use for the ARRL as an organization, as the advocate and representative for advancement of Amateur Radio. On balance, I would like to acknowledge those individuals inside the ARRL who have, over the years, worked very hard on the side of technology, research, and SS. You know who you are.

Repeater operators and users can forget about concerns they voiced of interference from SS systems. The data I included in my Comments provide a sample of the irrefutable evidence showing that interference is, at most, unlikely and infrequent. If there are any lingering doubts, feel free to look at a spectrum analyzer sometime; how does one interfere with something that isn't there?

I find it interesting that the weak-signal community would seek to differentiate narrowband-SS as acceptable practice; yet wideband-SS is unacceptable. This position exposes a fundamental lack of appreciation for the power of the underlying coding technology involved. I understand the motivation and I encourage the experimentation, confident that these folks will learn as we have, that the wider the signal gets, the better the result. It is just that the differentiation they seek should have no place in the Rules.

I remarked about Metricom in my Comments. After all, they are a struggling business, offering guaranteed service performance using spectrum to which they do not have exclusive title. Hmmm, but they are only offering this service where the population is dense and there is the possibility of profit. In the same breath, they would enjoin an Amateur from using their product modified with a high power transmit amplifier and receive low-noise preamplifier and high-gain directional antenna, to link across a long distance of wilderness or desert, because doing that might benefit the public interest or assist in a time of emergency. Something is wrong with this picture! The Rules have to work for everyone, everywhere, not just for a particular special interest. Sure, occasionally an Amateur will momentarily capture a Metricom transmission; he/she was granted that privilege when he/she earned his/her Amateur Operators License. I believe both TAPR and ARRL will further address this matter.

In my Comments, I recommended that the Commission turn aside the specific proposal made in this proceeding, in favor of a Rules change embodying the spirit of the STA. After careful consideration, I wish to go further: not only should SS be permitted in all Amateur spectrum (including HF), I suggest that the Rules be fundamentally altered so that "any unspecified code" is permitted without restriction anywhere within any Amateur band. This includes, but is not limited to, what we now think of as Frequency-Hopped Spread Spectrum (FHSS) coding, Direct Sequence Spread Spectrum (DSSS) coding, hybrid combinations of these, Forward Error Correction (FEC) codes of varying properties, all inclusive of digital modulation forms. This recommendation might take the form of: (a) removing section 97.311 in its entirety; (b) rewriting section 97.309 (the definition of the data emission) to permit any

imaginable digital code (with the sole prohibition that the code is not used to obscure the transmission) and that section 97.309(b)3 be eliminated; (c) editing section 97.307 to remove verbiage that implies bandwidth limitations for the data emission; and (d) adding entries in section 97.305(c) frequency band table giving the data emission access to the entire band.

I would also ask that the Commission eliminate the requirement of section 97.119(b)(5) for morse code identification of the data emission. This requirement of a cross-mode identification would be likely to cause interference, and a monitoring station would find it quite difficult to associate the narrow band CW emission with a particular data emission signal.

#### CONCLUSION

The ARS has a long tradition of innovation in communications. With the introduction of new communication methods have always come outcries from existing-mode users. Each new method has advanced the state of the communication art, eventually, in an orderly manner, supplanting the prior method. The ARS, unlike all the others, which the FCC manages, also has a history of self-management. It needs, and deserves, considerably less regulation, to allow it to achieve its Purposes, particularly sections 97.1 (b) (c) and (d). In this Proceeding, the Commission could significantly reduce its workload attributed to the ARS by recognizing these facts, and by removing the bandwidth limitations it has attached to each modulation mode and the arbitrary spectrum allocations given to the various modulation modes. Since SS is but one point on the continuum of digital coding technology, allowing any bandwidth provides system designers with the flexibility to determine what works and what doesn't. There are adequate provisions existent in the Rules to prevent undue interference from new modes, as there are Rules about appropriate transmit power levels. Digital Coding technology, whatever its form or emission consequence, should be freely permitted on ALL Amateur bands, not just those about 50 MHz as I proposed in my Comments, or above 420 MHz as is current.

RESPECTFULLY SUBMITTED,

//signed//

Robert A. Buaas K6KGS

---

## 29. Re: SS

From: Phil Karn <karn@qualcomm.com>  
Date: Wed, 4 Jun 1997 20:06:22 -0700 (PDT)  
To: david@braeside.demon.co.uk  
Cc: wd5ivd@tapr.org, amsat-bb@amsat.org, MOON-NET@vm.stlawu.edu, cbuttsch@slonet.org, ss@tapr.org  
Message-ID: <199706050306.UAA07702@servo.qualcomm.com>  
Rendered body type: text/plain

Given that this is a strong military signal on the 70cm band, and given that the primary (and historical) use of that band is government radiolocation (i.e., military radar), I would hazard a guess that this is a spread spectrum RADAR, not a spread spectrum communication system. As you know, radars generally operate at far higher powers than communication systems thanks to radar's built-in  $1/r^4$  propagation law (vs  $1/r^2$  for free space communications).

So the fact that a spread spectrum radar system causes interference is not an indication that a spread spectrum communication system will cause an equivalent amount of interference.

Spread spectrum is a natural modern technology for a radar system. Wideband signals are required in any radar system desiring accurate range resolution. Simple wideband pulses have long been used for this purpose, but they have several drawbacks: an extremely high peak-to-average power ratio, tolerable with tubes but unacceptable with solid state power amplifiers; a "range ambiguity" problem caused by the regular repetition pattern of the pulses; and a susceptibility to jamming caused again by their regular, predictable nature. Using a wideband PN (pseudo-noise) sequence (possibly cryptographically generated) as a radar signal solves many of these problems.

There is one remaining problem with a spread spectrum radar if it's a monostatic design (the same antenna transmits and receives). The signal cannot be continuous, because the transmitter would jam the receiver. (Bistatic radars, with widely separated transmitting and receiving antennas, avoid this problem). So if this is in fact a monostatic spread spectrum radar, chances are it is being gated on and off, probably quite rapidly and randomly.

And that gives us a way around it. just add enough forward error correction coding to our signal so that they can be decoded with, say, 50% of it missing and we'll do just fine.

This is an excellent example of fighting fire with fire when it comes to spread spectrum interference.

>If you want the scientific evidence, I will be happy to post you the >Spectrum Analyser plots... Its hard to be unemotional about this QRM.

I'd like to see them if it's not too difficult. I'd actually be more interested in some time domain plots, to see if it is in fact being rapidly gated on and off. You should be able to do this with most spectrum analyzers by setting the resolution bandwidth very high (wider than the signal), selecting "zero-span" mode and varying the horizontal sweep time to look for any signs of on-off gating.

Can you put these plots up on a web page?

--Phil

---

### 30. Re: [SS:1502] Re: SS

From: Phil Karn <karn@qualcomm.com>  
Date: Wed, 4 Jun 1997 20:11:50 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199706050311.UAA07716@servo.qualcomm.com>  
Rendered body type: text/plain

>Spreading over 3khz doesn't do much good -- does it ? Maybe there is a

Depends on the user data rate. Meeting a spreading limit with "narrowband spread spectrum" would simply mean that the user would have to limit himself to a very low user data rate to keep the processing gain acceptably high. This in turn would imply a low transmitter power if a reasonably efficient modulation and coding scheme was used.

You can scale the design of a spread spectrum up or down in bandwidth as long as you don't have any channel-dependent characteristics. But many important real-world channels \*do\* have frequency selective characteristics, and on these channels a "narrowband" spread spectrum system would encounter flat fading. So you might still get some time diversity, but little or no frequency diversity.

Phil

---

### 31. Re: [SS:1528] Re: SS

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Thu, 5 Jun 1997 00:49:52 -0500  
To: ss@tapr.org  
Message-ID: <v03020904afbc03bc847c@[208.134.134.40]>  
Rendered body type: text/plain

Hi Phil.

>>Spreading over 3khz doesn't do much good -- does it ? Maybe there is a >

>Depends on the user data rate. Meeting a spreading limit with >"narrowband spread spectrum" would simply mean that the user would have >to limit himself to a very low user data rate to keep the processing >gain acceptably high. This in turn would imply a low transmitter power >if a reasonably efficient modulation and coding scheme was used.

After I gave some thought on the matter it dawned on me what you are saying. I have been so focused on using the technology to solve our high-speed access issues, I forgotten many of the points you and Tom made in your paper last year.

>You can scale the design of a spread spectrum up or down in bandwidth >as long as you don't have any channel-dependent characteristics. But >many important real-world channels \*do\* have frequency selective >characteristics, and on these channels a "narrowband" spread spectrum

>system would encounter flat fading. So you might still get some time  
>diversity, but little or no frequency diversity.  
>  
>Phil

Cheers - Greg

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>  
-----

---

### 32. Re: [SS:1526] my Reply Comments

From: Jack Taylor <n700@goodnet.com>  
Date: Thu, 5 Jun 1997 07:53:54 -0700 (MST)  
To: ss@tapr.org  
Message-ID: <Pine.GS0.3.95.970605074757.18312B-100000@goodguy>  
Rendered body type: text/plain

Robert, well written and I like the concept of allowing SS on the HF  
bands. Was there a rationale for not including HF in the original request  
for rule making?  
73 de Jack

---

### 33. Re: [SS:1530] Re: my Reply Comments

From: Dewayne Hendricks <dewayne@warpspeed.com>  
Date: Thu, 5 Jun 1997 17:17:06 -0700  
To: ss@tapr.org  
Message-ID: <v03102820afbd0633a991@[45.6.0.6]>  
Rendered body type: text/plain

At 9:54 AM -0500 6/5/97, Jack Taylor wrote:  
>Robert, well written and I like the concept of allowing SS on the HF  
>bands. Was there a rationale for not including HF in the original request  
>for rule making?

That was a tactical decision. You try to fight the fights that you  
think you can win. Asking for SS on HF right off the bat would have started  
a 'jihad' in the service that would have made the No-Code battle (a battle  
I might add that is still not over) of several years back look like a grade  
school 'food fight'.

TAPR's stated intention (see the BoD's SS Policy Statment from last  
year) is to push for SS on HF in the future.

-- Dewayne  
Chair  
TAPR Regulatory Affairs Committee

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <<http://www.warpspeed.com/>>
Fax: (510) 770-9854 !
~~~~~

---

### 34. Re: [SS:1528] Re: SS

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>  
Date: Fri, 6 Jun 1997 04:24:38 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <199706060424.EAA11426@lynx.ve3jf.ampr.org>  
Rendered body type: text/plain

Phil Karn <karn@qualcomm.com> wrote:  
> >Spreading over 3khz doesn't do much good -- does it ? Maybe there is a  
>  
> Depends on the user data rate. Meeting a spreading limit with  
> "narrowband spread spectrum" would simply mean that the user would have  
> to limit himself to a very low user data rate to keep the processing  
> gain acceptably high. This in turn would imply a low transmitter power  
> if a reasonably efficient modulation and coding scheme was used.  
>  
> You can scale the design of a spread spectrum up or down in bandwidth  
> as long as you don't have any channel-dependent characteristics. But  
> many important real-world channels \*do\* have frequency selective



> characteristics, and on these channels a "narrowband" spread spectrum  
> system would encounter flat fading. So you might still get some time  
> diversity, but little or no frequency diversity.

3 KHz of spreading isn't very interesting at VHF/UHF, but HF is a different story. On ionospheric channels, delay spreads of several milliseconds are not unusual, leading to correlation bandwidths of less than 1 KHz - so spreading over 3 KHz can help to mitigate fading by providing some frequency diversity gain. Some years ago I was peripherally involved in the design of a DSSS HF modem which had a user data rate of 300 bps and spreading over 3 KHz (actually, spread over the bandwidth of a typical SSB IF filter, which is more like 2.4 KHz). It worked quite well, and was a candidate for the HF ACARS aeronautical data link system, but I think they ended up using something else. I did some tests on a link up into the Arctic, comparing the DSSS modem with an FDM-FSK modem which had roughly the same bandwidth and also provided 300 bps. The latter modem had 8 carriers, each carrying 75 bps BFSK - the carriers were grouped in diversity pairs, with something like 1.5 KHz spacing between the carriers in each pair, and a maximal-ratio combiner ahead of the demodulator for each pair. With equal average power, this modem actually outperformed the DSSS one. Maybe this indicates that explicit diversity beats the implicit diversity of DSSS in selective fading... or, maybe not. The DSSS modem has the advantage of a near-constant-envelope signal, so you could run it at higher average power with a given transmitter, which could help to equalize things. Some FEC would help too. Anyway, I digress. :-)

On a completely different topic, anybody on the list planning to be at the IEEE MTT-S Microwave Symposium in Denver next week? Wanna get together and talk SS 'n stuff? Let me know...

Barry

--

|                             |                                 |
|-----------------------------|---------------------------------|
| Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca  |
| Ottawa Amateur Radio Club   | AMPRnet: bm@lynx.ve3jf.ampr.org |
| Packet Working Group        | Web: http://hydra.carleton.ca   |

---

## 35. unsubscribe

From: aa <elecinst@pub.dl.lnpta.net.cn>  
Date: Fri, 6 Jun 1997 11:56:13 +0900  
To: ss@tapr.org  
Message-ID: <199706060256.LAA13262@pub.dl.lnpta.net.cn>  
Rendered body type: text/plain  
[Empty message body]

---

## 36. Reply Comments Docket 97-12 on SS Issues

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Fri, 6 Jun 1997 02:26:53 -0500  
To: "TAPR-BB list mailing" <tapr-bb@tapr.org>,  
"Spread Spectrum" <ss@tapr.org>,  
"TAPR Spread Sprctrum" <ss-sta@tapr.org>,  
"NETSIG list mailing" <netsig@tapr.org>,  
"TAPR Spread Sprctrum" <ss-sta@tapr.org>  
Message-ID: <v03020933afbd6ab9f5ad@[192.168.1.2]>  
Rendered body type: text/plain

Reply comment deadline for FCC Docket 97-12 (In the Matter of Amendment of Amateur Service Rules to Provide For Greater Use of Spread Spectrum Communication Technologies) was yesterday June 5th.

TAPR has started posting reply comments on our Spread Spectrum web page:  
<http://www.tapr.org/ss> go to the link "Spread Spectrum Rule Changes (RM-8737 & Doc. 97-12)"

The following reply comments are currently available for reading:

Tucson Amateur Packet Radio Corp 6/5/97  
Lyle Johnson, WA7GXD 6/5/97  
Glen Elmore, N6GN 6/5/97  
Robert Buass, K6KGS 6/5/97  
John Ackermann, AG9V 6/5/97  
Steve Dimse, K4HG 6/5/97  
Tom McDermott, N5EG 6/5/97  
John R Bingham, W7WKR 6/5/97  
John Koster, W9DDD 6/5/97

We expect to have more posted over the coming month as others send us

electronic copies and we get copies of other filings directly from the FCC.

If you filed a reply comment and would like to have it available on the web page, please drop me an e-mail message with the text of the reply comment.

Cheers - Greg Jones, WD5IVD

-----  
Tucson Amateur Packet Radio  
8987-309 E Tanque Verde Rd #337 \* Tucson, Az \* 85749-9399 \* 940-383-0000  
-----  
e-mail: TAPR@TAPR.ORG ftp: ftp.tapr.org web: <http://www.tapr.org/>  
-----

---

### 37. unsubscribe

From: Mick Ware <mickw@bedford.heartland.net>  
Date: Fri, 6 Jun 1997 06:20:36 -0500 (CDT)  
To: ss@tapr.org  
Message-ID: <199706061120.GAA05159@bedford.heartland.net>  
Rendered body type: text/plain

"Don't meddle in the affairs of dragons  
as you are crunchy and taste good with catsup!.

---

### 38. Linux router project

From: Bob Lorenzini <hwm@netcom.com>  
Date: Sun, 8 Jun 1997 16:03:17 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <Pine.LNX.3.95.970608160037.198A-100000@mm.wd6dod.ampr.org>  
Rendered body type: text/plain

There is an example single floopy boot router at  
[www.psychosis.com/linux-router/](http://www.psychosis.com/linux-router/). An embeded z80 project is in the works.

Bob - wd6dod

---

### 39. Update to Reply Comments

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Mon, 9 Jun 1997 15:03:15 -0500  
To: "TAPR Spread Sprctrum" <ss-sta@tapr.org>, " Spread Spectrum " <ss@tapr.org>,  
"TAPR-BB list mailing" <tapr-bb@tapr.org>  
Message-ID: <v03020948afc211a8248d@[192.168.1.2]>  
Rendered body type: text/plain

TAPR has started posting reply comments on our Spread Spectrum web page:  
<http://www.tapr.org/ss> then go to the link "Spread Spectrum Rule Changes  
(RM-8737 & Doc. 97-12)"

As of 6/9/97 the following reply comments are available on Docket 97-12

Tucson Amateur Packet Radio Corp 6/5/97  
ARRL 6/5/97  
Lyle Johnson, WA7GXD 6/5/97  
Glenn Elmore, N6GN 6/5/97  
Robert Buaas, K6KGS 6/5/97  
John Ackermann, AG9V 6/5/97  
Steve Dimse, K4HG 6/5/97  
Tom McDermott, N5EG 6/5/97  
John R Bingham, W7WKR 6/5/97  
John Koster, W9DDD 6/5/97  
Anthony McConnell, N3JLI and Jacob Brodsky, AB3A 6/5/97  
James Barron, Jr, KA5WSS 6/5/97  
Robert J. Carpenter 6/5/97  
Steven K. Stroh, N8GNJ 6/5/97

Comments that we think where filed, but haven't gotten on the web page  
include:

NCS  
W5YI  
Bill Tynan  
AMSAT

and some others I am sure...

Cheers - Greg, WD5IVD

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>  
-----

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#### 40. RE: My unsubscribe request...

From: dan\_hoyer\_at\_greenbay@ccm.frontiercorp.com  
Date: Mon, 09 Jun 97 17:10:37 -0500  
To: <ss@tapr.org>  
Message-ID: <9706098658.AA865894531@ccm.frontiercorp.com>  
Rendered body type: text/plain

Never mind. I found it on the unsubscribe page on the webserver.

Thanks anyway...

Dan

---

#### 41. Reply Comments

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Mon, 9 Jun 1997 23:25:01 -0500  
To: " Spread Spectrum " <ss@tapr.org>  
Message-ID: <v03020957afc2868f9cca@[192.168.1.2]>  
Rendered body type: text/plain

I just added the comments of W5YI group. We have the NCS, but someone will be typing them in...so expect them in a few days.

Also, still expecting an electronic version from AMSAT and some others in the next day or so.

If you filed reply comments, please send a copy to us so that we can get it on the page.

Cheers - Greg

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>  
-----

---

#### 42. unsubscribe

From: "Odd Skogjordet" <ods@nera.no>  
Date: Tue, 10 Jun 1997 08:14:07 +0100  
To: ss@tapr.org  
Message-ID: <412564B2.0027B285.00@notesmta.nera.no>  
Rendered body type: text/plain

[Empty message body]

---

#### 43. Re: [SS:1537] Update to Reply Comments

From: Phil Karn <karn@qualcomm.com>  
Date: Mon, 9 Jun 1997 23:04:39 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199706100604.XAA24073@servo.qualcomm.com>  
Rendered body type: text/plain

As an original commenter, I've gotten paper reply comments in the snail mail from AMSAT, W2RS and ARRL.

I didn't file any timely reply comments, but I'm thinking of filing "answer" comments that specifically rebut some of the reply comments I've seen. E.g., ARRL mentions my proposal of loosening power limits for EME and other space communications and then tries to shoot it down by saying that much EME operation is directed at the horizon, completely ignoring my suggestion that the power waiver could be predicated on a minimum antenna elevation.

Phil

---

#### 44. Additional Reply comments Docket 97-12

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Tue, 10 Jun 1997 05:10:58 -0500

To: " Spread Spectrum "<ss@tapr.org>, "TAPR Spread Sprctrum" <ss-sta@tapr.org>,  
"NETSIG list mailing"<netsig@tapr.org>  
Message-ID: <v0302096cafc2d66263b2@[192.168.1.2]>  
Rendered body type: text/plain

This is now the current list of reply comments to Docket 97-12. regarding  
Amendment of the Amateur Service Rules to Provide For Greater Use of Spread  
Spectrum Communication Technologies:

Tucson Amateur Packet Radio Corp 6/5/97  
ARRL 6/5/97  
Lyle Johnson, WA7GXD 6/5/97  
Glenn Elmore, N6GN 6/5/97  
Robert Buaas, K6KGS 6/5/97  
John Ackermann, AG9V 6/5/97  
Steve Dimse, K4HG 6/5/97  
Tom McDermott, N5EG 6/5/97  
John R Bingham, W7WKR 6/5/97  
John Koster, W9DDD 6/5/97  
Anthony McConnell, N3JLI and Jacob Brodsky, AB3A 6/5/97  
James Barron, Jr, KA5WSS 6/5/97  
Robert J. Carpenter 6/5/97  
Steven K. Stroh, N8GNJ 6/5/97  
THE W5YI GROUP 6/5/97  
AMSAT 6/5/97  
Central States VHF Society 6/5/97  
Bill Tynan, W3XO 6/5/97

<http://www.tapr.org/ss> use the link regarding rule making.

There are maybe just a few additional comments to complete the record.  
Thanks to all those that have sent electronic copies of their filings. I  
believe it helps everyone to see what positions are being taken and  
discussed regarding this important rule making process.

Cheers - Greg, WD5IVD

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>  
-----

---

## 45. Docket 97-12 Update

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Sat, 14 Jun 1997 11:33:05 -0500  
To: " Spread Spectrum "<ss@tapr.org>  
Message-ID: <v03020910afc877d3ea94@[208.134.134.40]>  
Rendered body type: text/plain

The following is now on the web page (<http://www.tapr.org/ss>). We have  
Metricom, CellNet Data Systems to still type in.

Cheers - Greg

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Reply Comments to Docket 97-12  
Tucson Amateur Packet Radio Corp 6/5/97  
ARRL 6/5/97  
Lyle Johnson, WA7GXD 6/5/97  
Glenn Elmore, N6GN 6/5/97  
Robert Buaas, K6KGS 6/5/97  
John Ackermann, AG9V 6/5/97  
Steve Dimse, K4HG 6/5/97  
Tom McDermott, N5EG 6/5/97  
John R Bingham, W7WKR 6/5/97  
John Koster, W9DDD 6/5/97  
Anthony McConnell, N3JLI and Jacob Brodsky, AB3A 6/5/97  
James Barron, Jr, KA5WSS 6/5/97  
Robert J. Carpenter 6/5/97  
Steven K. Stroh, N8GNJ 6/5/97  
THE W5YI GROUP 6/5/97  
AMSAT 6/5/97  
Central States VHF Society 6/5/97  
Bill Tynan, W3XO 6/5/97  
Raphael Soifer, W2RS 6/5/97

Comments to WT Docket No. 97-12  
Tucson Amateur Packet Radio Corp 5/5/97  
ARRL 5/5/97  
Lyle V. Johnson, WA7GXD 5/5/97  
Philip R. Karn, Jr, KA9Q 5/5/97  
Robert A. Buaas, K6KGS 5/5/97  
Central States VHF Society 5/5/97  
William A. Tynan, W3X0 5/5/97  
Part 15 Coalition 5/5/97  
220 MHz. Spectrum Management Association of Southern California  
(220sma) 5/5/97  
Raphael Soifer, W2RS 5/5/97  
AMSAT 5/5/97  
METRICOM, INC. 5/5/97  
The Manager of the National Communications System 5/5/97  
Robert Brown, N7STU 5/5/97

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
http://www.tapr.org/~wd5ivd  
-----

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#### 46. Re: [SS:1465] Re:Is SS The Solution For High Speed Packet Networks?

From: Phil Karn <karn@qualcomm.com>  
Date: Mon, 23 Jun 1997 18:27:01 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199706240127.SAA07520@servo.qualcomm.com>  
Rendered body type: text/plain

Catching up on old mail...

> There s a problem with the Slovenian radios for USA application.  
>The modulation quality would not be legal in the US, I believe. Also, a

Why not? There are no limits on the bandwidth of an "unspecified digital code" above the 70cm band (i.e., on 33cm and up, including 23cm).

> DSSS with the digital matched filter (DMF) can lock up in one  
>symbol time. The extra bandwidth of the signal allows for this, while

I think you misunderstand here. There is nothing about DSSS that inherently provides a faster lockup time. In fact, it is quite common for a spread spectrum system to take \*longer\* to acquire than a conventional unspread system. This is because there is an extra dimension -- code space -- that the receiver must search in addition to the usual dimensions of symbol timing and (if coherent demodulation is used) carrier phase.

The acquisition time depends on many factors. Typical values for DSSS systems range from a few seconds for IS-95 CDMA (about the same time it takes a conventional AMPS phone to scan and acquire a paging channel) to up to 15 minutes for a cold-started GPS receiver.

Phil

---

#### 47. Test

From: "Ing. Erick Castillo Nunez" <erick@kim.fcfm.buap.mx>  
Date: Mon, 23 Jun 1997 21:00:38 -0600  
To: ss@tapr.org  
Message-ID: <199706240300.VAA07299@kim.fcfm.buap.mx>  
Rendered body type: text/plain

Dont put attention to this mail is just to see if the SIG is working

---

#### 48. Re: [SS:1462] Is SS The Solution For High Speed Packet Networks?

From: Phil Karn <karn@qualcomm.com>  
Date: Mon, 23 Jun 1997 19:21:18 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199706240221.TAA07651@servo.qualcomm.com>  
Rendered body type: text/plain

>After doing a lot of research, it has become clear to me that SS suffers  
>from several major problems for practical use in a large network...

>(1) There are no fully documented systems using SS that are cost effective

>that I have found.

I work for a company that has done quite well designing and selling one fully documented SS system (CDMA digital cellular, described in TIA IS-95) and one proprietary SS satellite system (Omnitrac, on about 150,000 trucks worldwide). If you've seen an ad for Sprint PCS, you've seen ads for spread spectrum.

There are two other segments of the spread spectrum market that have become quite cost effective. GPS is one. The Part 15.247 LAN market is another.

>(2) Most of the SS systems I have looked at require a lot of tweaking to get >them to work, often meaning a near re-engineering of the system for each link.

Any non-trivial radio link requires engineering to achieve maximum potential. Spread spectrum is not different. It does, however, allow this engineering to be considerably simplified in many cases. E.g., in IS-95 CDMA it is not necessary to divide up your channel set into subsets for each cell as it is with AMPS (analog) cellular. Every cell uses the same 1.25 MHz channel.

>(3) None of the real experts doing SS development (I am not one of them!) >seem to be willing to develop a simple, reproducible SS system that can be >used right now.

Go buy a Qualcomm QCP-800 or -1900 or one of the other CDMA phones now on the market. We've reproduced this SS system well over a million times now and are continuing to do so at the rate of a few hundred thousand per month.

Or if you want high speed local area digital networking, buy one of the many Part 15.247 LAN cards on the market.

Oh, you meant an \*amateur\* spread spectrum network?? Oh, never mind. :-)

Phil

---

## 49. Re: [SS:1464] Re: Is SS The Solution For High Speed Packet Networks?

From: Phil Karn <karn@qualcomm.com>  
Date: Mon, 23 Jun 1997 19:33:57 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199706240233.TAA07698@servo.qualcomm.com>  
Rendered body type: text/plain

>I have been hearing about SS for several years now and have been trying >to understand how it works. I have learned that it does have some very >marvelous properties and has some important benefits. But not without >complications such as the requirement for extremely accurate clocks. >Some organizations such as the U.S. Army consider the benefits worth >the considerable expense of solving the complications and can raise the >money to pay for the required solutions.

This is another misconception. Spread spectrum does \*not\* inherently require overly expensive clocks any more than SSB or CW require highly accurate and expensive frequency references. It is true that some specific spread spectrum systems (such as IS-95 CDMA) do use accurate clocks for special purposes, specifically the synchronization of spreading codes of all the cells sharing a channel to simplify tracking and handoff in the mobile stations. But this is not an inherent requirement of all spread spectrum systems.

Indeed, one of the really nice things about spread spectrum (particularly direct sequence) is that it can be used to provide highly accurate time to end users at extremely low cost. In the IS-95 CDMA system, the accurate clock at each cell site is actually a GPS receiver which is itself a spread spectrum receiver.

Tom Clark (W3IWI) has produced a low-cost device he calls the Totally Accurate Clock (TAC) that uses a GPS receiver for this purpose. For a few hundred dollars it provides timing with accuracy comparable to very expensive atomic clocks. After all, the government has already paid for the clocks it puts on each GPS satellite, so why not take advantage of them?

Phil

---

## 50. Re: [SS:1469] Re: Is SS The Solution For High Speed Packet

From: Phil Karn <karn@qualcomm.com>  
Date: Mon, 23 Jun 1997 19:45:58 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199706240245.TAA07719@servo.qualcomm.com>  
Rendered body type: text/plain

>Given enough bandwidth, digital voice is no problem... Even at 56 Kbps it is  
>possible (the quality is not too great, but it's not all that bad). This  
>needs some more thought time!

When digital telephony started back in the early 1960s with the Bell System T-carrier system (the origin of the term "T-1"), 64kb/s was chosen as the standard voice data rate. Only direct PCM waveform encoding was practical to implement with the technology then available. And acceptable voice quality with logarithmically companded PCM requires this high a data rate. (Two different logarithmic PCM schemes are used: mu-255 in the US and Japan, and A-law in Europe.)

56kb/s is 7/8 of 64 kb/s. This data rate comes about because the original T-carrier system "robbed" the occasional low order bit of the data stream for control signalling. The voice quality degradation was imperceptible, but it made this bit useless for data. So when digital data services were provided over T-carrier systems, this bit was simply thrown away in the multiplexer.

Today you can provide very good voice quality at considerably less than 56kb/s. GSM, a popular digital cellular system in Europe, uses a 13 kb/s vocoder. CDMA uses QCELP, a variable rate system with peak data rates of 9.6 and 14.4 kb/s. A public domain GSM vocoder has been available in C from the Technical University of Berlin for several years. Qualcomm is just now releasing free "plugins" for QCELP (which we call Pure Voice). Both run in real time on modern PCs. Both are excellent candidates for amateur experiments with digital voice.

If you want to hear what these coders sound like, visit my web page:

<<http://people.qualcomm.com/karn/ham.html>>

Look for the section "Error control audio demos".

--Phil

---

## 51. Re: [SS:1471] Re:Is SS The Solution For High Speed Packet

From: Phil Karn <karn@qualcomm.com>  
Date: Mon, 23 Jun 1997 19:55:10 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199706240255.TAA07741@servo.qualcomm.com>  
Rendered body type: text/plain

>Is this really a good idea? For all practical purposes, this eliminates any  
>sort of an organized network that is available in emergencies, one of the  
>prime reasons we even have the badns in the first place.

[...]

>I believe that to provide reliable, predictable emergency services, there  
>must be some sort of organized network, perhaps something that users can  
>access, but this may pose a few problems as well, especially in high  
>population areas where you could have hundreds (maybe more) of users jumping  
>on at once.

At the risk of igniting a flame war, I believe the direct application of ham radio to emergency communications is now just about irrelevant. There are too many alternatives that are too available and work too well. Furthermore, new alternatives are appearing for high speed Internet access to the home that don't suffer from the inherent drawbacks of ham radio, e.g., restrictions on content, encryption, business use, etc.

I personally have three different non-radio ways to get on the Internet from home: dialup 28.8k modem, ISDN at 64k/128k, and cable modem. In a month or two ADSL trials are starting in my area. And lacking all that, I could put up a Part 15 link to Qualcomm if I had to.

Freed from the "mandate" to provide emergency communications, and freed from the illusion that we'll ever build a large scale, high speed Internet on the ham bands, I see ham radio returning to its experimental roots with an emphasis on technical training and education. The skills you pick up as a ham can certainly be applied to

emergency communications, most likely using non-amateur equipment. But the days of ham radio as a serious alternative (emergency or otherwise) to non-amateur facilities are over for good.

Phil

---

## 52. Re: [SS:1549] Re:Is SS The Solution For High Speed Packet

From: Marty Albert <marty@trucom.com>  
Date: Mon, 23 Jun 1997 23:14:23 -0500  
To: ss@tapr.org  
Message-ID: <1.5.4.32.19970624041423.0068124c@mail.trucom.com>  
Rendered body type: text/plain

At 22:17 06/23/97 -0500, Phil Karn wrote:  
>At the risk of igniting a flame war, I believe the direct application  
>of ham radio to emergency communications is now just about  
>irrelevant. There are too many alternatives that are too available and  
>work too well. Furthermore, new alternatives are appearing for high  
>speed Internet access to the home that don't suffer from the inherent  
>drawbacks of ham radio, e.g., restrictions on content, encryption,  
>business use, etc.  
>  
>I personally have three different non-radio ways to get on the  
>Internet from home: dialup 28.8k modem, ISDN at 64k/128k, and cable  
>modem. In a month or two ADSL trials are starting in my area. And  
>lacking all that, I could put up a Part 15 link to Qualcomm if I had  
>to.  
>  
>Freed from the "mandate" to provide emergency communications, and  
>freed from the illusion that we'll ever build a large scale, high  
>speed Internet on the ham bands, I see ham radio returning to its  
>experimental roots with an emphasis on technical training and  
>education. The skills you pick up as a ham can certainly be applied to  
>emergency communications, most likely using non-amateur equipment. But  
>the days of ham radio as a serious alternative (emergency or  
>otherwise) to non-amateur facilities are over for good.  
>  
>Phil

No flames here, Phil... Personally, I agree with you.

I have had personal experience with a couple of disasters (one earthquake and one hurricane) where the land line phones and cell phones both continued to work perfectly well, even in the middle of the disaster area. When I offered Ham radio assistance at the earthquake, the emergency service folks put down the phone and looked at me like I had three eyes. :)

I personally would like to see a return to the "earlier roots" of Ham radio, but I for one don't know how we can get there from here... "Here" being a lot of political infighting over: (1) Who is and who is not a Ham, and; (2) What Hams do and do not do. (or is that do be do be do?)

Take Care & 73

Marty Albert - marty@trucom.com  
Amateur Radio: KC6UFM@KC6UFM.#SEMO.MO.USA.NOAM

\*\*\*\*\*  
Interested in Amateur Radio?  
<http://www.trucom.com/ppages/marty>  
\*\*\*\*\*  
HAMPS Coordinator  
<http://www.geocities.com/CapeCanaveral/Lab/7067>  
\*\*\*\*\*

---

## 53. Re: [SS:1549] Re:Is SS The Solution For High Speed Packet

From: Lyle Johnson <lylej@azstarnet.com>  
Date: Mon, 23 Jun 1997 21:57:53 -0700  
To: ss@tapr.org  
Message-ID: <3.0.32.19970623215422.00737700@pop.azstarnet.com>  
Rendered body type: text/plain

>Freed from the "mandate" to provide emergency communications, and  
>freed from the illusion that we'll ever build a large scale, high  
>speed Internet on the ham bands, I see ham radio returning to its  
>experimental roots with an emphasis on technical training and  
>education. The skills you pick up as a ham can certainly be applied to  
>emergency communications, most likely using non-amateur equipment. But



>the days of ham radio as a serious alternative (emergency or  
>otherwise) to non-amateur facilities are over for good.

Once the three competing LEO cell-phone systems are running, I'll agree that Amateur radio as a "serious" emergency communications system will be irrelevant. We'll have to justify our use of increasingly valuable, publicly-owned spectrum largely on the basis of the technical good that can be reaped from it, either directly or, as Phil says here, indirectly by providing a resource for people to experiment and apply to commercial endeavors.

Cheers,

Lyle

---

#### 54. Re: [SS:1548] Re: Is SS The Solution For High Speed Packet

From: Thomas Sailer <sailer@ife.ee.ethz.ch>  
Date: Tue, 24 Jun 1997 10:27:27 +0200  
To: ss@tapr.org  
Message-ID: <33AF84EF.2206@ife.ee.ethz.ch>  
Rendered body type: text/plain

> Today you can provide very good voice quality at considerably less  
> than 56kb/s. GSM, a popular digital cellular system in Europe, uses a  
> 13 kb/s vocoder. CDMA uses QCELP, a variable rate system with peak  
> data rates of 9.6 and 14.4 kb/s. A public domain GSM vocoder has been  
> available in C from the Technical University of Berlin for several  
> years. Qualcomm is just now releasing free "plugins" for QCELP (which  
> we call Pure Voice). Both run in real time on modern PCs. Both are

I assume this is a binary only release (I mean QCELP)? In this case, it doesn't help experimentation much :-)

You don't need an upcoming SS system to transmit digital voice, DK7WJ reports success on using 2.4kbit/s LPC over the current packet radio network here in Europe.

73s  
Tom

---

#### 55. Re: Is SS The Solution For High Speed Packet

From: Thomas Sailer <sailer@ife.ee.ethz.ch>  
Date: Tue, 24 Jun 1997 10:35:21 +0200  
To: ss@tapr.org  
Message-ID: <33AF86C9.7D71@ife.ee.ethz.ch>  
Rendered body type: text/plain

> I have had personal experience with a couple of disasters (one earthquake  
> and one hurricane) where the land line phones and cell phones both continued  
> to work perfectly well, even in the middle of the disaster area. When I

I could cite a counterexample: In a relatively recent flood of a river in a valley (Wallis), the commercial cell phone systems ceased to operate, while the local ham repeater (solar powered with battery backup) continued to operate

This doesn't mean I think of hamradio as a reliable disaster comms medium, just to show that you can find examples for both scenarios

Tom

---

#### 56. Re: [SS:1337] Re: SS ID

From: ru3ap@gw.ra3apw.ampr.org (tol)  
Date: Tue, 24 Jun 97 10:58:17 +0000  
To: ss@tapr.org  
Message-ID: <508@gw.ra3apw.ampr.org>  
Rendered body type: text/plain

I DONT READ YOUR MESSAGE AT MY monitor,why?

---

#### 57. Re: [SS:1553] Re: Is SS The Solution For High Speed Packet

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Tue, 24 Jun 1997 11:16:09 -0500  
To: ss@tapr.org  
Message-ID: <v03020910afd59d45c89a@[208.134.134.40]>  
Rendered body type: text/plain

Let me state my position, which is somewhere in the middle and probably better reflects the transitional explanations of both sides.

Ham radio is good in an emergency currently because of the fact that you have a group of volunteers who can show up on very short notice who have communications that are outside the commercial infrastructure. They then provide that communications until the commercial situation is cleared up. Since many phone systems are never designed for the emergency peak traffic encountered during a disaster, amateur radio still has something to offer in those first few hours -- at least currently.

These first few hours can last a few hours to a few days, depending on the situation. There are plenty of examples I am sure we could all relate that would seem to fit this definition. We show up and help out and then leave. These instances work better if the amateur radio community has contacts with those that need or want the help, thus you see good examples of this when the amateur community has been working with Red Cross or other emergency preparedness groups before the event. Just showing up and saying 'we are here' -- typically gets you the reaction that Marty described.

However, each time an emergency happens, the commercial systems learn something a little new and begin to think about how to correct these problems in the future. It will not be long, I predict, that commercial will become smart enough to deal with many of the issues up to just losing there sites. A lot of this also depends on the nature of the event. The scope of the event determines again how useful amateur radio will be in helping out and for how long.

As Phil and others have stated and I have written about, things are in change and many of us have noticed or are just now noticing. It seems like in the 80's we could drive around and use autopaths on repeaters and the delay that using them caused was okay, because it was better than no communications. Now, if there is \_no\_ emergency event to cause that peak traffic occurrence, then using amateur radio when you have a gazillion people around on the highway that can make contact faster and in a way that emergency services understand due to the frequency it happens -- we are behind the curve. The last time I used the autopath to call in an emergency -- 2 years ago -- it had already been reported by 5 people and it took me 2 mins to explain who I was and that yes I wasn't using a cell phone. You still read about the instance where amateur radio saved the day because it was off-road and the like. Amateur radio still provides services, but to sit on the ground with ones head buried in the sand hoping that things will not change is a bad situation and we have this happening on many levels within our community and within groups leading our community into the future.

How this change effects us is up to us. Also, it is up to us to try to explain to others that things are changing. It might not be this year, or next year, but it sure will be in the next 5-10 years. It is not bad that things are changing. It just means we can't expect to use examples that are over 10 to 20 years old to keep our service a viable spectrum user.

Now as Barry will comment in the next few message I believe -- time to get back on SS and make this experimentation thing happen.

Cheers - Greg

```
>> I have had personal experience with a couple of disasters (one earthquake
>> and one hurrican) where the land line phones and cell phones both continued
>> to work perfectly well, even in the middle of the disaster area. When I
>
>I could cite a counterexample: In a relatively recent flood of a river
>in a valley (Wallis), the commercial cell phone systems
>ceased to operate, while the local ham repeater (solar powered
>with battery backup) continued to operate
>
>This doesn't mean I think of hamradio as a reliable disaster comms
>medium, just to show that you can find examples for both scenarios
>
>Tom
```

```
-----
Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----
```

## 58. Re: [SS:1552] Re: Is SS The Solution For High Speed Packet

From: Phil Karn <karn@qualcomm.com>  
Date: Tue, 24 Jun 1997 10:46:46 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199706241746.KAA22224@servo.qualcomm.com>  
Rendered body type: text/plain

>I assume this is a binary only release (I mean QCELP)? In this  
>case, it doesn't help experimentation much :-)

Yeah, most likely binary only. I wish it were available in source  
(I've been lobbying internally for that) but it seems unlikely. In any  
event, I don't think the lack of source really precludes ham  
experimentation if you just want to use the vocoder as a building  
block for some digital speech experiments.

>You don't need an upcoming SS system to transmit digital voice,  
>DK7WJ reports success on using 2.4kbit/s LPC over the current  
>packet radio network here in europe.

Entirely true. Of course, 2.4kb/s LPC sounds almost as bad as ssb. :-)

Phil

---

## 59. Re: [SS:1553] Re: Is SS The Solution For High Speed Packet

From: Phil Karn <karn@qualcomm.com>  
Date: Tue, 24 Jun 1997 10:51:59 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199706241751.KAA22241@servo.qualcomm.com>  
Rendered body type: text/plain

>I could cite a counterexample: In a relatively recent flood of a river  
>in a valley (Wallis), the commercial cell phone systems  
>ceased to operate, while the local ham repeater (solar powered  
>with battery backup) continued to operate

>This doesn't mean I think of hamradio as a reliable disaster comms  
>medium, just to show that you can find examples for both scenarios

Yes, anecdotes can be cited both ways. Some people cite anecdotes of  
people freakishly surviving auto crashes because they \*didn't\* wear  
their seatbelts and then argue that they shouldn't wear seat belts. :-)

I have my own anecdote from personal experience that goes the other  
way. It prompted me to get a cell phone and never to rely on ham radio  
again for a highway emergency.

Anecdotes aside, there is no question that amateur radio's role in  
emergencies is decreasing rapidly and asymptotically towards zero.

Phil

---

## 60. emergency communications

From: Tony McConnell <n3jly@erols.com>  
Date: Tue, 24 Jun 1997 14:26:19 -0400  
To: ss@tapr.org  
Cc: frussle@erols.com  
Message-ID: <199706241826.OAA03467@smtp3.erols.com>  
Rendered body type: text/plain

Phil said:

But  
the days of ham radio as a serious alternative (emergency or  
otherwise) to non-amateur facilities are over for good.

Phil

i must overall agree with you here. but i still look back at  
the packet bash at dayton this year and can see the smoke pouring  
out of the ears of that guy you cheesed off about this topic.

i've working in the communications field for a while now. i  
worked on putting up some of the very first cell sites ever built.  
i've worked on some ham radio repeaters. i stand by your statement  
that evening in dayton that after the hurricane/earthquake/....  
whatever the cellsite has a better chance of still being working.  
battery&generator backed, proper transient suppression on antenna  
and phone lines, quality installation. microwave linking in many  
cases. the ability to turn off users that are overloading a system

to keep it clear for real emergency users(though i don't believe this is used in most amps systems). compare this to people who run a system that can't figure out if polyphaser was from star trek or star wars.

## 61. Re:Is SS The Solution For High Speed Packet Networks?

From: Don Lemke <wb9mjin@wb9mjin.ampr.org>  
Date: Tue, 24 Jun 1997 12:53:31 -0500  
To: ss@tapr.org  
Message-ID: <33B0099B.4AE6@wb9mjin.ampr.org>  
Rendered body type: text/plain

Hi Phil, Marty, Thomas, and Greg

> Catching up on old mail...  
>  
> > There s a problem with the Slovenian radios for USA application.  
> >The modulation quality would not be legal in the US, I believe. Also, a  
>  
> Why not? There are no limits on the bandwidth of an "unspecified digital  
> code" above the 70cm band (i.e., on 33cm and up, including 23cm).  
>

Ok. I might be wrong here, hi. I thought that the BW was apparently wider, based on the unfiltered digital signal being sent directly to the PSK modulator. Apparently there is some filtering due to the BW of the amplifiers that the digital signal passes thru, based on Marty's measurement of the BW. I was expecting -13 dB side lobes. We still need to be -60 dB down outside the band, right? And as the coordination has us right up next to the edge of the band (1297-1300) i was concerned. I was also unaware that the laws were so loose above 1 Ghz, inband. I did not mean to discourage anybody from using the Slovenian Design, but to carefully review and tweak it for US application.

> > DSSS with the digital matched filter (DMF) can lock up in one  
> >symbol time. The extra bandwidth of the signal allows for this, while  
>  
> I think you misunderstand here. There is nothing about DSSS that  
> inherently provides a faster lockup time. In fact, it is quite common  
> for a spread spectrum system to take \*longer\* to acquire than a  
> conventional unspread system. This is because there is an extra  
> dimension -- code space -- that the receiver must search in addition  
> to the usual dimensions of symbol timing and (if coherent demodulation  
> is used) carrier phase.  
>

That may be true. But i still maintain that DMF DSSS has faster lock up time than other commonly used amateur modems. Below is a quote from the Stanford Telecom data sheet for the the STEL-2000A product:

"The STEL-2000A is designed to operating in either burst of continuous mode: in burst mode, the built-in symbol counters allow bursts of up to 65533 symbols to be automaitically transmitted or received, while in continous mode, the data is simply treated as a burst of infinite length. The STEL-2000A's use of a digital PN Matched Filter for code detection and despreading permits signal and symbol timing acquistions in just one symbol."

Of course that s one data symbol, not chip symbol. I found this hard to believe too, and have verified it in a converstation with Stanford Telecom application engineer. I also remember from the SAW class in i took in College, that back in those days, this job was done with SAW convolvers. Again, the acquisition was essentially instant.

A Digital Matched Filter Convolver (correlator?) is allot more silicon real estate than an Acquire and Track Despreading technique. Thus the 18 dB processing gain limitation of the STEL-2000A, with rapid acquisition. Versus the extremely high processing gain of chips intended for CDMA, using Tau Dither, or other Acquisition and Track techniques and these techniques acquisition time limitations. Its a trade off.

I also mentioned this to you, Barry was there too, at the DCC which took place in Texas at the LaQuinta Inn.

It makes sense that a broader bandwidth signal, might have faster acquisition. Just as a rise time thru a broader bandwidth is shorter. DMF DSSS is a way to use that broader SS signal to work for a digital communication system goals.

A cellular access technique may be better off with low data rates, high processing gains, and CDMA, and infrastructure. A DDMA-WAN technique needs high acquisition efficiency, high data rate, and antenna directivity, but no infrastructure.

> The acquisition time depends on many factors. Typical values for DSSS  
> systems range from a few seconds for IS-95 CDMA (about the same time  
> it takes a conventional AMPS phone to scan and acquire a paging channel)  
> to up to 15 minutes for a cold-started GPS receiver.  
>  
> Phil

--

73, Don.

AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]  
Internet: wb9mjn@wb9mjn.ampr.org@uugate.aim.utah.edu  
Website: <http://www.qth.com/antpanel>

---

## 62. Re: [SS:1549] Re:Is SS The Solution For High Speed Packet

From: Kent Farnsworth <akent@bga.com>  
Date: Tue, 24 Jun 1997 19:24:42 -0500  
To: ss@tapr.org  
Message-ID: <199706250024.TAA02453@zoom.bga.com>  
Rendered body type: text/plain

Hello Phil:

I beg to differ with you in very important ways, as explained below:

At 10:17 PM 6/23/97 -0500, you wrote:

>snip<

>

>>I believe that to provide reliable, predictable emergency services, there  
>>must be some sort of organized network, perhaps something that users can  
>>access, but this may pose a few problems as well, especially in high  
>>population areas where you could have hundreds (maybe more) of users jumping  
>>on at once.

Agreed. Hams have that organization in most areas.

>At the risk of igniting a flame war, I believe the direct application  
>of ham radio to emergency communications is now just about  
>irrelevant. There are too many alternatives that are too available and  
>work too well. Furthermore, new alternatives are appearing for high  
>speed Internet access to the home that don't suffer from the inherent  
>drawbacks of ham radio, e.g., restrictions on content, encryption,  
>business use, etc.  
>

>I personally have three different non-radio ways to get on the  
>Internet from home: dialup 28.8k modem, ISDN at 64k/128k, and cable  
>modem. In a month or two ADSL trials are starting in my area. And  
>lacking all that, I could put up a Part 15 link to Qualcomm if I had  
>to.

I also have several non ham methods of communications. I also live just outside of Austin, Texas, where the tornadoes recently hit. I have ISDN, a POTS modem, digital and analog cell, and my ham gear. When the tornado hit about a mile from my house, it took out the bell switch station (gone are POTS and ISDN), and the cell tower (cell out, too). The only way any communications came in and out from here was via the amateur channels. I have a generator in my motor home, and could transmit and receive digital as well as analog information from the amateur stations operating in this emergency, from my larger equipment, at great distances from me. My good ole HT let me make phone calls via a patch, located quite a ways away. There will ALWAYS be a need for amateur radios in emergencies. I know first hand. A good many amateurs in the area helped a really great deal in this.

>

>Freed from the "mandate" to provide emergency communications, and  
>freed from the illusion that we'll ever build a large scale, high  
>speed Internet on the ham bands, I see ham radio returning to its  
>experimental roots with an emphasis on technical training and  
>education. The skills you pick up as a ham can certainly be applied to

>emergency communications, most likely using non-amateur equipment. But  
>the days of ham radio as a serious alternative (emergency or  
>otherwise) to non-amateur facilities are over for good.  
>

Granted, the ham bands will probably never be able to access the internet the same way as the land lines can. That's not the point. The internet is not the best place for emergency traffic anyway. Without power to the providers, thar' ain't no internet.

>Phil  
>  
>  
>  
>  
--- Kent Farnsworth (akent@bga.com)

---

## 63. Re: Emergency Communications, and Ham Radio

From: Don Lemke <wb9mjn@wb9mjn.ampr.org>  
Date: Tue, 24 Jun 1997 20:06:00 -0500  
To: ss@tapr.org  
Message-ID: <33B065CB.63D3@wb9mjn.ampr.org>  
Rendered body type: text/plain

Hi All,

Everybody seems to be getting sidetracked on the Emergency Communications Problem again. This came up on the Netsig group a few weeks ago. I think my response to that conversations, says it all. Modest, aren't I ;-). So, I'm going to send it to this news group:

> Hi All,  
>  
> While its laudable that everybody is so concerned about emergency  
> communications, I don't think hams will build an amateur network to do a  
> job that is primarily the governments' responsibility. We do have a duty  
> to chip in, of course. But the primary responsibility for any emergency  
> communications system is that of the government.  
>  
> I think its pretty much clear, that if we can outdo the ISPs, that  
> Hams will build MAN's in support of Internet access, and in doing so,  
> end up with allot of extra on-air capability. Such as Packet TV  
> networking, what is called "Video Teleconferencing" on the Internet. And  
> hey, even emergency communications!  
>  
> This really is how things have always been on Ham Radio. Hams do  
> not buy HF rigs, or build FM repeaters (after the first one in an area)  
> for primarily emergency communications. This stuff DOES get pressed into  
> emergency service, tho, because its omnipresent. And its Omnipresence  
> that is Ham Radio's emergency communication strength.  
>  
> The biggest advantage to TCP/IP, with Internet connectivity is that  
> of the large efficiency of scale of the application layer developement.  
> Somebody wants to try something new, and exciting, just does it. They  
> download the demo from the internet, and use it between on-air, or  
> on-air / internet operations. We ignore being in-step with this momentum  
> at our own peril. And Hey, it might even be useful for emergency  
> communications!  
>  
> We are given the emergency communications purpose, because we are  
> useful to the government in emergency situations. Not because we are  
> trying to do the governments job, for the responsible organisations in  
> the government. We will not be useful, if we are not doing something,  
> and that something is not omnipresent.  
>  
> DDMA-WAN, that i've talked about elsewhere is an example of  
> something that we can do, that's fun, and useful, and does not take an  
> omnipresent organisation, to someday generate an omnipresent capability.  
>  
>  
> --  
>  
> 73, Don.

--

73, Don.

AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]

#### 64. Re: [SS:1559] Re:Is SS The Solution For High Speed Packet Networks?

From: Frank & Sue Perkins <fperkins@OnRamp.NET>  
Date: Tue, 24 Jun 1997 21:15:11 -0500  
To: ss@tapr.org  
Message-ID: <33B07F2F.4105@mailhost.onramp.net>  
Rendered body type: text/plain

Don Lemke wrote:

>  
> Hi Phil, Marty, Thomas, and Greg  
>  
> > Catching up on old mail...  
> >  
> > > There s a problem with the Slovenian radios for USA application.  
> > >The modulation quality would not be legal in the US, I believe. Also, a  
> >  
> > Why not? There are no limits on the bandwidth of an "unspecified digital  
> > code" above the 70cm band (i.e., on 33cm and up, including 23cm).  
> >  
>  
> Ok. I might be wrong here, hi. I thought that the BW was apparently  
> wider, based on the unfiltered digital signal being sent directly to the  
> PSK modulator. Apparently there is some filtering due to the BW of the  
> amplifiers that the digital signal passes thru, based on Marty's  
> measurement of the BW. I was expecting -13 dB side lobes. We still need  
> to be -60 dB down outside the band, right? And as the coordination has  
> us right up next to the edge of the band (1297-1300) i was concerned. I  
> was also unaware that the laws were so loose above 1 Ghz, inband. I did  
> not mean to discourage anybody from using the Slovenian Design, but to  
> carefully review and tweak it for US application.  
>  
> > > DSSS with the digital matched filter (DMF) can lock up in one  
> > >symbol time. The extra bandwidth of the signal allows for this, while  
> >  
> > I think you misunderstand here. There is nothing about DSSS that  
> > inherently provides a faster lockup time. In fact, it is quite common  
> > for a spread spectrum system to take \*longer\* to acquire than a  
> > conventional unspread system. This is because there is an extra  
> > dimension -- code space -- that the receiver must search in addition  
> > to the usual dimensions of symbol timing and (if coherent demodulation  
> > is used) carrier phase.  
> >  
>  
> That may be true. But i still maintain that DMF DSSS has faster lock  
> up time than other commonly used amateur modems. Below is a quote from  
> the Stanford Telecom data sheet for the the STEL-2000A product:  
>  
> "The STEL-2000A is designed to operating in either burst of  
> continuous mode: in burst mode, the built-in symbol counters allow  
> bursts of up to 65533 symbols to be automaitically transmitted or  
> received, while in continous mode, the data is simply treated as a burst  
> of inifinite length. The STEL-2000A's use of a digital PN Matched Filter  
> for code detection and despreading permits signal and symbol timing  
> acquistions in just one symbol."  
>  
> Of course that s one data symbol, not chip symbol. I found this hard  
> to believe too, and have verified it in a converstation with Stanford  
> Telecom application engineer. I also remember from the SAW class in i  
> took in College, that back in those days, this job was done with SAW  
> convolvers. Again, the acquistion was essentially instant.  
>  
> A Digital Matched Filter Convolver (correlator?) is allot more  
> silicon real estate than an Acquire and Track Despreading technigue.  
> Thus the 18 dB processing gain limitation of the STEL-2000A, with rapid  
> acquistion. Versus the extremely high processing gain of chips intended  
> for CDMA, using Tau Dither, or other Acquisition and Track technigues  
> and these technigues acquistion time limitations. Its a trade off.  
>  
> I also mentioned this to you, Barry was there too, at the DCC which  
> took place in Texas at the LaQuinta Inn.  
>  
> It makes sense that a broader bandwidth signal, might have faster  
> acquisition. Just as a rise time thru a broader bandwidth is shorter.  
> DMF DSSS is a way to use that broader SS signal to work for a digital  
> communication system goals.  
>

```

> A cellular access technique may be better off with low data rates,
> high processing gains, and CDMA, and infrastructure. A DDMA-WAN
> technique needs high acquisition efficiency, high data rate, and
> antenna directivity, but no infrastructure.
>
>
> > The acquisition time depends on many factors. Typical values for DSSS
> > systems range from a few seconds for IS-95 CDMA (about the same time
> > it takes a conventional AMPS phone to scan and acquire a paging channel)
> > to up to 15 minutes for a cold-started GPS receiver.
> >
> > Phil
>
> --
>
> 73, Don.
>
> AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
> Internet: wb9mjn@wb9mjn.ampr.org@uugate.aim.utah.edu
> Website: http://www.qth.com/antpanel

```

Simple example of DSSS with DMF attached - QB 4.5, run in DOS (window)

73 Frank WB5IPM  
 [Attachment: Spread.zip; application/x-zip-compressed; 28,474 bytes]

## 65. Re: [SS:1556] Re: Is SS The Solution For High Speed Packet

From: Thomas Sailer <sailer@ife.ee.ethz.ch>  
 Date: Wed, 25 Jun 1997 11:31:48 +0200  
 To: ss@tapr.org  
 Message-ID: <33B0E584.94@ife.ee.ethz.ch>  
 Rendered body type: text/plain

```

> event, I don't think the lack of source really precludes ham
> experimentation if you just want to use the vocoder as a building
> block for some digital speech experiments.

```

This ties you up to the platforms Qualcomm happens to support, and leads you to depend on Q's fortune. There are many vocoders with source code around, and I suspect QCELP wouldn't so much better than the rest that I don't quite see why I should use QCELP :-)

```

> > You don't need an upcoming SS system to transmit digital voice,
> > DK7WJ reports success on using 2.4kbit/s LPC over the current
> > packet radio network here in europe.

```

```

> Entirely true. Of course, 2.4kb/s LPC sounds almost as bad as ssb. :-)

```

This is probably comparable in speech quality to the 16kbit/s CVSD codec used in Detis voice mail system for S&F. And I've never heard any of the many users complain about the voice quality.

I suspect Qualcomm made a different experience with IS95? Is that why you've silently increased the peak bitrate of QCELP to 13kbit/s? (it was around 7kbit/s if I remember correctly some time ago)

Tom

## 66. Microstrip antenna design - help !

From: Ted Manolescu <tmanolescu@instantel.com>  
 Date: Wed, 25 Jun 1997 12:15:42 -0400  
 To: "'ss@tapr.org'" <ss@tapr.org>  
 Cc: "'hfsig@tapr.org'" <hfsig@tapr.org>, "'ham@sss.org'" <ham@sss.org>  
 Message-ID: <13684FD9F298D011AD8800609769CE77071247@mailhost.Instantel.com>  
 Rendered body type: text/plain

Hi everybody !

Does anybody know some references ( technical literature and software tools design ) for microstrip antenna ?

Thanks in advance !

Ted Manolescu  
 613 592 4642

## 67. Re: [SS:1549] Re:Is SS The Solution For High Speed Packet

From: N5RG@aol.com  
 Date: Wed, 25 Jun 1997 13:12:27 -0400 (EDT)  
 To: ss@tapr.org



Cc: k5di@acca.nmsu.edu  
Message-ID: <970625131220\_322908056@emout11.mail.aol.com>  
Rendered body type: text/plain

Phil:

I must commend you for your courage in stating what the situation actually is. The sooner the Amateur Radio world comes to grip with reality, the sooner it will be able to make some progress.

- > At the risk of igniting a flame war, I believe the direct application
- > of ham radio to emergency communications is now just about
- > irrelevant. There are too many alternatives that are too available and
- > work too well. Furthermore, new alternatives are appearing for high
- > speed Internet access to the home that don't suffer from the inherent
- > drawbacks of ham radio, e.g., restrictions on content, encryption,
- > business use, etc.

I agree. And there are several new methods that are about to appear.

- > Freed from the "mandate" to provide emergency communications, and
- > freed from the illusion that we'll ever build a large scale, high
- > speed Internet on the ham bands, I see ham radio returning to its
- > experimental roots with an emphasis on technical training and
- > education. The skills you pick up as a ham can certainly be applied to
- > emergency communications, most likely using non-amateur equipment. But
- > the days of ham radio as a serious alternative (emergency or
- > otherwise) to non-amateur facilities are over for good.

Unless a total collapse of our society occurs, I think you are correct. In spite of some forecasts of impending doom, I don't think our society is going to collapse any time soon.

73, Roy W7IDM, ex N5RG & W5PAG

---

## 68. Re: [SS:1558] emergency communications

From: Mike Scott <mike@aloha.net>  
Date: Wed, 25 Jun 1997 08:48:16 -1000  
To: ss@tapr.org  
Message-ID: <33B167F0.5468@aloha.net>  
Rendered body type: text/plain

Tony McConnell wrote:

- >
- > Phil said:
- > But
- > the days of ham radio as a serious alternative (emergency or
- > otherwise) to non-amateur facilities are over for good.
- >
- > Phil
- >
- > i must overall agree with you here. but i still look back at
- > the packet bash at dayton this year and can see the smoke pouring
- > out of the ears of that guy you cheesed off about this topic.
- >
- > i've working in the communications field for a while now. i
- > worked on putting up some of the very first cell sites ever built.
- > i've worked on some ham radio repeaters. i stand by your statement
- > that evening in dayton that after the hurricane/earthquake/....
- > whatever the cellsite has a better chance of still being working.
- > battery&generator backed, proper transient suppression on antenna
- > and phone lines, quality installation. microwave linking in many
- > cases. the ability to turn off users that are overloading a system
- > to keep it clear for real emergency users(though i don't believe this
- > is used in most amps systems). compare this to people who run a
- > system that can't figure out if polyphaser was from star trek or
- > star wars. Just as an FYI...I was (still am) in Hawaii when Iniki struck and both
- > cellular carriers were off the air. Ham radio was our only source of
- > comms for several days.

---

## 69. Re: [SS:1564] Microstrip antenna design - help !

From: jeff@mich.com  
Date: Wed, 25 Jun 1997 19:59:39 -0400  
To: ss@tapr.org, Ted Manolescu <tmanolescu@instantel.com>  
Message-ID: <2.2.32.19970625235939.00d85fd0@mail.mich.com>  
Rendered body type: text/plain

At 06:15 PM 6/25/97 -0500, Ted Manolescu wrote:

>

>  
> Hi everybody !  
> Does anybody know some references ( technical literature and software  
>tools design ) for microstrip antenna ?

I have some stuff on making impedance matched strip lines on PCB's for doing high speed ECL/Digital design but I don't think this is what you want. It focus's on the dielectric constant of the substrate (G4 or teflon), the thickness of the substrate and the width of the trace. The trace in all cases is above a ground plane and/or power plane. This was from a high speed PCB design course I took a few years ago.

Let me know if you find anything regarding microstrip antennas, in particular ones you can etch on a PCB, I'd be quite interested.

Thanks

-Jeff  
Regards,

```
-----  
| Jeff King      Aero Data Systems |  
| jeff@mich.com  P.O. Box 510895   |  
| (810)471-1787  Livonia, MI 48151 |  
| F(810)471-0279 United States     |  
-----
```

---

## 70. Re: [SS:1566] Re: emergency communications

From: "P.A. Sadowski" <sadowski@bellatlantic.net>  
Date: Wed, 25 Jun 1997 22:05:55 -0400  
To: ss@tapr.org  
Message-ID: <33B1CE83.7321@bellatlantic.net>  
Rendered body type: text/plain

> > star wars. Just as an FYI...I was (still am) in Hawaii when Iniki struck and both  
> cellular carriers were off the air. Ham radio was our only source of  
> comms for several days.

I was there too - a little known fact but Hawaiian Tel received special FCC permission to use a Ham Repeater to do business on for a short while. The repeater above Makakilo - Oahu was solid into Kauai... so it was used to assist HawTel in aligning the microwave gear that the US Marines flew into Kauai - from Molokai for HawTel! also for about a week (since almost all the lines on Kauai were down) the same repeater was used to request medicine and emergency supplies... a number of resorts now have ham antenna's installed (despite the "negative" visual impact) because that was the only way their guests were able to relay their safe status to the world... a lot of folks on Kauai have a different attitude towards Hams due to that "little" storm...

bottom line is that for a couple days Ham radio was it into the island of Kauai... even military stuff wasn't running much less commercial stuff... BTW... southern Fla (Homestead) had same problem... sure, the Telco's eventually got mobile/portable Cell Sites in... but for a few days it was just hams...

No flame's intended here... neither should we pat ourselves on the back ... we are being attacked for our spectrum space by commercial interests... and only by education can we show the public/gov't what we can contribute... hopefully one area is in technology - like SS

How much Q'Comm stock do folks here own?

---

## 71. Re: [SS:1564] Microstrip antenna design - help !

From: rparsons@paccomm.com (Ronald G. Parsons)  
Date: Thu, 26 Jun 1997 02:35:08 +0000  
To: ss@tapr.org  
Message-ID: <v02140b08afd77e368226@[205.238.168.59]>  
Rendered body type: text/plain

"Microstrip Antenna Technology", IEEE Trans. on Antennas and Propagation, Vol. AP-29, No. 1, January 1981, p.2

>  
> Hi everybody !  
> Does anybody know some references ( technical literature and software

>tools design ) for microstrip antenna ?  
> Thanks in advance !  
> Ted Manolescu  
> 613 592 4642

-----  
Ron Parsons W5RKN

---

## 72. Re: [SS:1560] Re:Is SS The Solution For High Speed Packet

From: Rolf Sommerhalder <rs@ife.ee.ethz.ch>  
Date: Thu, 26 Jun 1997 12:50:52 +0200 (MET DST)  
To: ss@tapr.org  
Message-ID: <199706261050.MAA19714@gillespie.ee.ethz.ch>  
Rendered body type: text/plain

There have been several comments on emergency telecommunications and HAM radio on this list. Please allow me to express my private concern that the international community could perceive some HAM organisations as not being prepared to cooperate with relief organisations very well.

On May 17, we had World Telecommunication Day 1997 (WTD'97) by the International Telecommunication Union (a U.N. organisation). This year's main theme was emergency communications (see <http://www.itu.ch/PPI/wtd/>). In front of ITU's and the UN's main building in Geneva, we had set-up a huge tent full of exhibits geared towards emergency telecommunication which was operated and demonstrated life. This week-long exhibition received a lot of attention from the public and from officials of governmental, international and non-governmental organisations. During the event, the Working Group on Emergency Telecommunications (WGET) was meeting to discuss (among other topics) the necessity of allocating some VHF analog FM voice channels for inter-agency emergency coordination on an international basis.

At the same time, a very active partner struggled to set-up a similar, though much smaller, event in the US at Dallas/Texas on JR's Southfork Range, featuring satellite links, video conferencing and amateur radio with Geneva. During the preparation of the WGET meeting, this partner was checking and discussing the possibility of allocating those VHF channels in the 2m HAM band in accordance with ITU Resolution 640. Res. 640 recommends administrations to allow emergency relief organisations to use HAM bands, but this requires approval by the national authorities on a case-by-case basis.

Unfortunately, the "HAM community" (i.e. the ARRL and the IARU, or at least some of their exponents) was not even prepared to discuss the proactive allocation of such coordination channels in the 2m HAM band which would only come into use in emergency situations, and after the national authority would permit operation under Res. 640. I was told by the organizer that in consequence, the "HAM community" did even boycott the Dallas event on WTD'97, missing the opportunity to mark its presence in the emergency relief world.

After this, combined with my own experience in emergency operations with Swiss disaster relief (SDR) during small and large scale exercises in Switzerland and real missions abroad, I am convinced that it is an illusion wanting to share HAM bands during emergency relief operations: even though operating under Res. 640, we have been intentionally and un-intentionally jammed during life-saving relief operations and exercises. In consequence, I will strongly work within SDR towards moving all our VHF gear (wakie-talkies, repeaters) away from the 2m HAM band. I will also strongly support the decision of the WGET to allocate some VHF coordination channels on an international basis which will be far off from the 2m HAM band.

Being a HAM myself, I think the attitude taken by some HAM organisations on defending spectrum is unfortunate in this particular case: official relief organisations and HAMs will not be able to communicate and coordinate in emergencies seamlessly anymore. And the HAM community paradoxically gives up a particular good reason for having exclusive spectrum allocations: being part of emergency telecommunications and being able to immediately "rent out" spectrum to official relief organisations during acute emergencies per Res. 640.

Converse to this, most of the active telecomm experts in my group at SDR are/have been HAMs. The human resources which HAM radio can potentially contribute to emergency telecommunications is considerable and is being welcome by the international relief community.

So much for the reality on emergency telecommunications in connection

with HAM radio. If this mailing list considers this discussion drifting off-topic, then I could suggest another list where to continue the discussion (even though that list is specific to international emergency telecommunications, but not particularly HAM-related/-oriented).

73,  
Rolf (HB9CWP)

---

### 73. Re: emergency communications

From: Don Lemke <wb9mjn@wb9mjn.ampr.org>  
Date: Mon, 30 Jun 1997 11:57:44 -0500  
To: ss@tapr.org  
Message-ID: <33B7E588.C76@wb9mjn.ampr.org>  
Rendered body type: text/plain

Hi Guys,

As Hawaii Tel did during the aftermath of Hurricane Iniki, Ameritech did after a man made disaster. When the west suburban switching center, went up in flames, here in Chicagoland, the local 145.25 repeater was used by Ameritech in the reconstruction efforts. Their own in-house capability had been destroyed by the fire.

This is a real-world actually-happened example of the Omnipresence point I made in a previous message.  
--

73, Don.

AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]  
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu  
Website: <http://www.qth.com/antpanel>

---

# July 1997

Original source file: ss.9707

Source: [http://ftp.tapr.org/tapr\\_history/SIG\\_Archives/spread-spectrum-sig/mail\\_archive/ss.9707](http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9707)

## 1. Field measurements.

From: Guilherme Augusto Toledo Franca <gfranca@demic.fee.unicamp.br>  
Date: Tue, 1 Jul 1997 19:07:53 -0300 (EST)  
To: ss@tapr.org  
Cc: gatf@hotmail.com  
Message-ID: <199707012207.TAA28695@demic01.fee.unicamp.br>  
Rendered body type: text/plain

Hi everybody !

Does anybody know some references (technical literature) for spread spectrum measurements?  
I would like to insert some data about it in my thesis.  
I made some trials and I would like to confirm my notes.  
Thanks in advance !

Guilherme A. Toledo Franca

P.S.: Does anybody know telemetry system using ss?

---

## 2. Field measurements.

From: Guilherme Augusto Toledo Franca <gfranca@demic.fee.unicamp.br>  
Date: Tue, 1 Jul 1997 19:07:50 -0300 (EST)  
To: ss@tapr.org  
Cc: gatf@hotmail.com  
Message-ID: <199707012207.TAA28693@demic01.fee.unicamp.br>  
Rendered body type: text/plain

Hi everybody !

Does anybody know some references (technical literature) for spread spectrum measurements?  
I would like to insert some data about it in my thesis.  
I made some trials and I would like to confirm my notes.  
Thanks in advance !

Guilherme A. Toledo Franca

P.S.: Does anybody know telemetry system using ss?

---

## 3. Microstrip Antennas

From: gilw9bub@nw4ep.ih.lucent.com (Gil Kowols)  
Date: Tue, 1 Jul 1997 10:58:01 -0500 (CDT)  
To: tapr.org!ss@nw4ep.ih.lucent.com  
Message-ID: <m0wj5Ja-00015IC@w9bub>  
Rendered body type: text/plain

At 06:15 PM 6/25/97 -0500, Ted Manolescu wrote:

>>  
>>  
>> Hi everybody !  
>> Does anybody know some references ( technical literature and software  
>>tools design ) for microstrip antenna ?  
>  
>I have some stuff on making impedance matched strip lines on PCB's  
>for doing high speed ECL/Digital design but I don't think this  
>is what you want. It focus's on the dielectric constant of the  
>substrate (G4 or teflon), the thickness of the substrate and  
>the width of the trace. The trace in all cases is above a ground  
>plane and/or power plane. This was from a high speed PCB design  
>course I took a few years ago.  
>  
>Let me know if you find anything regarding microstrip antennas, in  
>particular ones you can etch on a PCB, I'd be quite interested.  
>  
>Thanks  
>  
>-Jeff  
>Regards,  
>  
>  
>  
>"Microstrip Antenna Technology", IEEE Trans. on Antennas and Propagation,  
>Vol. AP-29, No. 1, January 1981, p.2  
>

```

>
>>
>> Hi everybody !
>> Does anybody know some references ( technical literature and software
>>tools design ) for microstrip antenna ?
>> Thanks in advance !
>> Ted Manolescu
>> 613 592 4642
>
>-----
>Ron Parsons W5RKN
>
>

```

In fact, the entire issue is as complete a bibliography as you can find.

Future to that, issues of Microwave Journal and RF Design has many practical articles. One of the best is RF Design for June 1988 has "Principles of Microwave Design"; RF Design also has software to simplify calculation. There is a service that sells disks with the software.

Boulder Microwave Technologies, Inc. in conjunction with California State University at Northridge (College of Engineering) gives a course about now on "Computer-Aided Design of Printed antennas and Arrays" featuring their software around this time of the year.  
Their software is pricey but good.

Finally, Artech has numerous books on Microstrip design.

gil, W9BUB  
gil@svs.com

---

#### 4. Re: [SS:1572] Field measurements.

From: frussle@erols.com (Jake Brodsky)  
Date: Wed, 02 Jul 1997 12:43:15 GMT  
To: ss@tapr.org  
Message-ID: <33bc43c9.1413226@smtp.erols.com>  
Rendered body type: text/plain

On Tue, 1 Jul 1997 17:11:43 -0500 (CDT), Guilherme A. Toledo Franca wrote:

>P.S.: Does anybody know telemetry system using ss?

I am an engineer responsible for the design and operation of a 130 site SCADA telemetry system used by a large water and sewer utility. I've seen more than a few salesmen with "license-free" spread spectrum radios in the past. Frankly, I'll stick with the Multiple Address Radio (MAR) service for our telemetry needs for now. Here's why:

(1) When installing a telemetry system, you have to consider the ability of a technician to diagnose what's wrong and get it back up and running in a hurry. Very few technicians know much about Spread Spectrum. Even fewer know how tell if the radio is working right or not. It's hard enough to find a technician who knows anything about RF in general, let alone Spread Spectrum.

(2) A Spread Spectrum equivalent of a Service Monitor (such as manufactured by Motorola, Cushman, or IFR) doesn't yet exist. You can't just spew data on the air for an ad-hoc BER test. Our system is too busy for that. We need the ability to check a radio's performance while off-line.

(3) We would have to tolerate interference in a Spread Spectrum system. In our current licensed system, we don't. This is not a trivial matter. Our system is designed around several cells with master polling radios for that area. These master sites are located on top of water towers. They pick up an awful lot of signals. They use omnidirectional antennas (because the telemetry sites are scattered all around them), so the chances of picking up stray signals are good. It's bad enough when we get weather inversions and pick up skip from 70 miles away. We don't need direct noise from some twit's LAN bridge he uses to get across the street.

(4) We work with small path fade margins. This is not because we want to, but because the FCC won't license us for more ERP. Our remotes

are limited to five watts (and whatever gain we can get from an antenna) and our master transmitters are limited to 15 watts, or some ERP number which I can't remember off the top of my head these days... Spread Spectrum telemetry radios would need lots of process gain to get what we have now with only one watt (the limit to Part 15 devices). Further, our Spread Spectrum radio Master site would cover a very wide area with lots of SS pseudo-noise. In other words, we'd trash an awful lot of installations currently using Part 15 spread spectrum equipment.

I would like to use Spread Spectrum radios when the technology matures, but for now the technical support just isn't there.

Jake Brodsky, <mailto:frussle@erols.com>  
"Nearly fifty percent of all graduates came from the bottom half of the class."

---

## 5. Re: [SS:1573] Field measurements.

From: "Alan J. Eynon" <[aeynon@micro.ti.com](mailto:aeynon@micro.ti.com)>  
Date: Wed, 02 Jul 1997 08:21:44 -0500  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Cc: "Alan J. Eynon" <[aeynon@micro.ti.com](mailto:aeynon@micro.ti.com)>  
Message-ID: <3.0.32.19970702082144.00695adc@pcmail.micro.ti.com>  
Rendered body type: text/plain

Hi Guilherme,

> Does anybody know some references (technical literature) for spread spectrum measurements?

What parameters did you want to measure?

>P.S.: Does anybody know telemetry system using ss?

The Tracking and Data Relay Satellite system used by NASA for space shuttle communications (including telemetry) employs spread spectrum. I believe Holmes did a very good treatment of it in his book Coherent Spread Spectrum Communications. I can provide you the exact reference off-line if you wish.

73,  
Alan  
N3IRL

Software Development Systems, Stafford, Texas Instruments, +1 281-274-2943

-----  
"DESTROY 99% OF KNOWN HOUSEHOLD PESTS WITH PRE-SLICED, RUSTPROOF, EASY TO HANDLE, LOW CALORIE SIMPSON'S INDIVIDUAL EMPEROR STRINGETTES, FREE FROM ARTIFICIAL COLORING (AS USED IN HOSPITALS)." -- Monty Python

---

## 6. need help

From: Aureusgrp@aol.com (by way of Greg Jones, WD5IVD)  
Date: Wed, 2 Jul 1997 19:08:32 -0500  
To: "NETSIG list mailing" <[netsig@tapr.org](mailto:netsig@tapr.org)>,  
"Spread Spectrum" <[ss@tapr.org](mailto:ss@tapr.org)>,  
"HF SIG list mailing" <[hfsig@tapr.org](mailto:hfsig@tapr.org)>  
Message-ID: <v03020912afe09dde0102@208.134.134.40>  
Rendered body type: text/plain

For those that might be interested.

Greg

-----

Hi. We're specialized recruiters and could really use you help. A client of ours has a high profile DAMA program and has a critical need for one or more DAMA engineers. These are exciting positions in design, development, and systems integration. Knowledge of appropriate mil-stds is part of the picture too. Who do you know that I can talk to? Thank you so much for any help you can give us. Nancy Ulbert, CPC aureusgrp@aol.com or 800-289-4044.

---

## 7. Re: [SS:1577] need help

From: Lyle Johnson <[lylej@azstarnet.com](mailto:lylej@azstarnet.com)>  
Date: Wed, 02 Jul 1997 21:19:50 -0700  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <3.0.32.19970702211815.007707b4@pop.azstarnet.com>  
Rendered body type: text/plain

At 07:20 PM 7/2/97 -0500, you wrote:  
>For those that might be interested.  
>  
>Greg  
>  
>-----  
>  
>Hi. We're specialized recruiters and could really use you help. A client of  
>ours has a high profile DAMA program and has a critical need for one or more  
>DAMA engineers. These are exciting positions in design, development, and  
>systems integration. Knowledge of appropriate mil-stds is part of the picture  
>too. Who do you know that I can talk to? Thank you so much for any help you  
>can give us. Nancy Ulbert, CPC aureusgrp@aol.com or 800-289-4044.  
>  
Greg,

These guys get big bucks to recruit, so if anyone repsinds, through this  
message, please inform the recruiter that 25% of his fee goes to TAPR or  
you don't take the job :-)

(The fees are often 40% to 60% of the annual compensation of the person  
recruited - I know, we just went through one to get a person we needed...)

Cheers,

Lyle

---

## 8. Re: need help

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Thu, 3 Jul 1997 00:13:02 -0500  
To: ss@tapr.org  
Cc: "HF SIG list mailing" <hfsig@tapr.org>,  
"NETSIG list mailing" <netsig@tapr.org>  
Message-ID: <v0302090aafe0e51dc2bd@[208.134.134.40]>  
Rendered body type: text/plain

Thanks for letting us know Lyle. Hopefully someone will make sure that  
TAPR gets the finders fee if they respond. I know we could sure use it.

I sure didn't know.

Cheers - Greg

>At 07:20 PM 7/2/97 -0500, you wrote:  
>>For those that might be interested.  
>>  
>>Greg  
>>  
>>-----  
>>  
>>Hi. We're specialized recruiters and could really use you help. A client of  
>>ours has a high profile DAMA program and has a critical need for one or more  
>>DAMA engineers. These are exciting positions in design, development, and  
>>systems integration. Knowledge of appropriate mil-stds is part of the picture  
>>too. Who do you know that I can talk to? Thank you so much for any help you  
>>can give us. Nancy Ulbert, CPC aureusgrp@aol.com or 800-289-4044.  
>>  
>Greg,  
>  
>These guys get big bucks to recruit, so if anyone repsonds, through this  
>message, please inform the recruiter that 25% of his fee goes to TAPR or  
>you don't take the job :-)  
>  
>(The fees are often 40% to 60% of the annual compensation of the person  
>recruited - I know, we just went through one to get a person we needed...)  
>  
>Cheers,  
>  
>Lyle

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>  
-----



## 9. ss rf engine

From: Glenn Little <glittle@awod.com>  
Date: Thu, 03 Jul 1997 07:58:54 -0400  
To: ss@tapr.org  
Message-ID: <199707031153.HAA04834@sumter.awod.com>  
Rendered body type: text/plain

O'Neill Connectivities. Inc. offers a spread spectrum RF engine at an incredible \$84.00 each. Unit appears to be 2.5 inches square and is surface mount construction. Phnone 1-800-OCI-LAWN, <http://www.ocilawn.com>. This is from June 1997 EE Product News.

73

---

|                                   |                  |               |
|-----------------------------------|------------------|---------------|
| Glenn Little                      | glittle@awod.com | QCWA LM 28417 |
| Amateur Callsign: WB4UIV          | wb4uiv@amsat.org | AMSAT LM 2178 |
| QTH: Goose Greek, SC USA (EM92xx) |                  | ARRL          |

---

## 10. Re: [SS:1580] ss rf engine

From: David G Taylor <taylor@ecn.purdue.edu>  
Date: Thu, 3 Jul 1997 14:33:31 -0600  
To: ss@tapr.org  
Message-ID: <v03007802afe1bbf63136@[128.46.169.162]>  
Rendered body type: text/plain

>O'Neill Connectivities. Inc. offers a spread spectrum RF engine at an  
>incredible \$84.00 each. Unit appears to be 2.5 inches square and is surface  
>mount construction. Phnone 1-800-OCI-LAWN, <http://www.ocilawn.com>. This is  
>from June 1997 EE Product News.

>

>73

Actually, they are \$169 Q 1-9, but if you do buy them 10K+ at a time, they are \$84....Plus you have to buy the Developers Package for \$5000 first.

Still, it looks interesting.  
david, KB9KNS

---

Dr. David G. Taylor - Director - Instrumentation  
Purdue University, School of Chemical Engineering, 1283 CHME Blvd.  
West Lafayette, IN 47907-1283 USA V(765) 494-4085 Fax(765) 494-0805

## 11. Re: [SS:1559] Re:Is SS The Solution For High Speed Packet Networks?

From: Phil Karn <karn@qualcomm.com>  
Date: Thu, 3 Jul 1997 17:45:19 -0700 (PDT)  
To: Don Lemke <wb9mjn@wb9mjn.ampr.org>  
Cc: ss@tapr.org  
Message-ID: <199707040045.RAA05019@servo.qualcomm.com>  
Rendered body type: text/plain

Don,

>measurement of the BW. I was expecting -13 dB side lobes. We still need  
>to be -60 dB down outside the band, right? And as the coordination has

Ah, so you were talking about out-of-band emissions. I thought you mean the intentional in-band signal bandwidth was too wide. Never mind.

There are still a lot of nonsequiters about SS in your last message. To take a few:

> "The STEL-2000A is designed to operating in either burst of  
>continuous mode: in burst mode, the built-in symbol counters allow  
>bursts of up to 65533 symbols to be automaitically transmitted or  
>received, while in continous mode, the data is simply treated as a burst  
>of infinite length. The STEL-2000A's use of a digital PN Matched Filter  
>for code detection and despreading permits signal and symbol timing  
>acquistions in just one symbol."

Much is unstated here, specifically the length of the PN code. It is simply not possible to "instantaneously" acquire a long PN code unless you either have a priori knowledge of where to search (e.g., with synchronized clocks) or use a \*lot\* of parallelism to search the entire space at once.

> Of course that s one data symbol, not chip symbol. I found this hard  
>to believe too, and have verified it in a converstation with Stanford  
>Telecom application engineer. I also remember from the SAW class in i

>took in College, that back in those days, this job was done with SAW  
>convolvers. Again, the acquisition was essentially instant.

ANY spread spectrum demodulator is a convolver; a SAW is simply one physical implementation. So is a fully digital implementation consisting of multiplier and accumulator/low pass filter. Even with complete parallelism (which a SAW filter can provide) the performance of any such demodulator is limited by basic mathematical laws and system parameters like SNR.

Note also that in a true SS/CDMA system you have several independent signals using the same PN code arriving at nearly the same power level but with more than one chip of offset. The demodulator has to be told which signal(s) to track; a passive SAW filter will just give you their sum.

> A Digital Matched Filter Convolver (correlator?) is allot more  
>silicon real estate than an Acquire and Track Despreading technique.

This is a classic tradeoff between parallelism and real estate.

>Thus the 18 dB processing gain limitation of the STEL-2000A, with rapid  
>acquisition. Versus the extremely high processing gain of chips intended  
>for CDMA, using Tau Dither, or other Acquisition and Track techniques  
and these techniques acquisition time limitations. Its a trade off.

Processing gain is a function of the chip rate and data symbol rate, not the demodulator, though certain demodulator architectures may have trouble dealing with signals that have large processing gains, and others may be so suboptimum as to provide much less than the nominal processing gain. IS-95 CDMA has a process gain of 21 dB for the 9.6kb/s data rate, which is no so "extremely high" compared to your 18 dB figure.

> It makes sense that a broader bandwidth signal, might have faster  
>acquisition. Just as a rise time thru a broader bandwidth is shorter.  
>DMF DSSS is a way to use that broader SS signal to work for a digital  
>communication system goals.

Nope, doesn't follow. Again, acquisition time depends on many factors:

1. Length of PN code sequence (size of search space)
2. A-priori knowledge of where to search in code space
3. Degree of parallelism in receiver search hardware.
4. Signal SNR, data Eb/N0 and data rate. You must dwell on each point in the search space long enough to accumulate enough signal energy to produce a reliable detection.

This last one can NOT be overcome with parallelism. Even if you have enough hardware to look at every code phase hypothesis simultaneously, you still have to integrate their outputs long enough to accumulate sufficient energy to make a reliable detection. Depending on the modulation and coding in use, this will typically be on the order of some small number of data symbol times. If the process gain is very high, this could be a very large number of chips.

Phil

---

## 12. Re: [SS:1563] Re: Is SS The Solution For High Speed Packet

From: Phil Karn <karn@qualcomm.com>  
Date: Thu, 3 Jul 1997 19:26:14 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199707040226.TAA05535@servo.qualcomm.com>  
Rendered body type: text/plain

>This ties you up to the platforms Qualcomm happens to support,  
>and leads you to depend on Q's fortune. There are many vocoders  
>with source code around, and I suspect QCELP wouldn't so much better  
>than the rest that I don't quite see why I should use QCELP :-)

You've been reading my mind -- I said exactly the same thing to the marketing types here who are deciding how QCELP software is going to be released to the Internet community.

>I suspect Qualcomm made a different experience with IS95? Is  
>that why you've silently increased the peak bitrate of QCELP  
>to 13kbit/s? (it was around 7kbit/s if I remember correctly some time  
>ago)

Yeah, "Rate Set 1" CDMA used four frame rates: 9.6/4.8/2.4/1.2 kb/s. "Rate Set 2" increases them all 50%, to 14.4/7.2/3.6/1.8 kb/s. Frames are always 20 ms long, and the data rate changes only on frame boundaries.

Actually, all those rates are overstated as they include overhead bits that are not available to the vocoder or the data protocol, including a CRC (size depends on rate, e.g., 12 bits/frame for the 9.6 rate), a type bit and a 8-bit tail of zeros for the K=9 convolutional encoder.

There is an audible difference between the Rate Set 1 and 2 vocoders. Both are entirely intelligible, but the lower rate set has a characteristic "burbling" effect on background noise that some people find distracting. So we implemented Rate Set 2 largely at the request of the carriers. Also, when our primary competition was IS-54B TDMA with its 8kb/s vocoder, we had to keep our data rate down to keep system capacity up. (At one time TDMA was talking about a 4.8 kb/s "half rate" coder.) Now that TDMA is pretty much dead and GSM with its 13kb/s rate is the primary alternative to CDMA, we could afford to go a little faster.

The main advantage of QCELP over other vocoders is its variable rate feature. This is a real win with CDMA. It's also a win with store-and-forward voice mail, as the average reduction in encoded data rate turns directly into a reduction in the size of the message file. It's of considerably less use for real time voice on a packet network like the Internet because of the substantial per-packet overhead of UDP/IP. The only way to get a substantial benefit from a "variable rate" coder in Internet telephony without adding a lot of packetization delay is to stop sending packets entirely when the user stops talking. And you can do this with VOX or PTT.

Phil

---

### 13. Re: [SS:1566] Re: emergency communications

From: Phil Karn <karn@qualcomm.com>  
Date: Thu, 3 Jul 1997 19:35:41 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199707040235.TAA05590@servo.qualcomm.com>  
Rendered body type: text/plain

>Just as an FYI...I was (still am) in Hawaii when Iniki struck and both  
>cellular carriers were off the air. Ham radio was our only source of  
>comms for several days.

Iniki was an eternity ago in terms of cellular industry timescales. Compare the number and variety of cell sites then with those available now. (It was 1992, right? I know it was during the location filming of Jurassic Park, which released summer 1993.)

Also, several large LEO satellite cellular systems are on the way (Iridium, Globalstar). When these are operational, we'll have global cellular coverage that cannot be taken out by local storms.

>Granted, the ham bands will probably never be able to access the internet  
>the same way as the land lines can. That's not the point. The internet is  
>not the best place for emergency traffic anyway. Without power to the  
>providers, thar' ain't no internet.

Depends on the nature of the traffic. I can see a lot of emergency-related traffic that's much better suited for the Internet than for the telephone network, just as it is for much routine traffic.

Another claim often made in support of ham radio's "essential" role in emergency communications is that commercial radio facilities are often functional but overloaded during an emergency, leaving ham radio. It's amazing that people don't realize how dangerous this argument is. It tells the policy makers that the way to prepare for an emergency is to reallocate underutilized ham spectrum to allow the overloaded commercial facilities to expand. After all, the commercial users are already \*far\* more efficient in their use of spectrum than the hams are.

Phil

---

### 14. Re: [SS:1584] Re: emergency communications

From: "Basuki E. Priyanto" <priya@students.itb.ac.id>  
Date: Fri, 4 Jul 1997 09:52:13 +0700 (JVT)

To: ss@tapr.org  
Message-ID: <Pine.BSI.3.96.970704095051.9684E-100000@students.itb.ac.id>  
Rendered body type: text/plain

btw : could satellite cellular reliable for data communication ?

how fast ?

On Thu, 3 Jul 1997, Phil Karn wrote:

> >Just as an FYI...I was (still am) in Hawaii when Iniki struck and both  
> >cellular carriers were off the air. Ham radio was our only source of  
> >comms for several days.  
>  
> Iniki was an eternity ago in terms of cellular industry  
> timescales. Compare the number and variety of cell sites then with  
> those available now. (It was 1992, right? I know it was during the  
> location filming of Jurassic Park, which released summer 1993.)  
>  
> Also, several large LEO satellite cellular systems are on the way  
> (Iridium, Globalstar). When these are operational, we'll have global  
> cellular coverage that cannot be taken out by local storms.  
>  
> >Granted, the ham bands will probably never be able to access the internet  
> >the same way as the land lines can. That's not the point. The internet is  
> >not the best place for emergency traffic anyway. Without power to the  
> >providers, thar' ain't no internet.  
>  
> Depends on the nature of the traffic. I can see a lot of  
> emergency-related traffic that's much better suited for the Internet  
> than for the telephone network, just as it is for much routine traffic.  
>  
> Another claim often made in support of ham radio's "essential" role in  
> emergency communications is that commercial radio facilities are often  
> functional but overloaded during an emergency, leaving ham radio. It's  
> amazing that people don't realize how dangerous this argument is. It  
> tells the policy makers that the way to prepare for an emergency is to  
> reallocate underutilized ham spectrum to allow the overloaded  
> commercial facilities to expand. After all, the commercial users are  
> already \*far\* more efficient in their use of spectrum than the hams  
> are.  
>  
> Phil  
>  
>

\*\*\*\*\*  
Best Regards,  
BASUKI E. PRIYANTO  
"Beat Spread Spectrum"  
Mail:priya@itb.ac.id  
\*\*\*\*\*

---

## 15. Re: [SS:1585] Re: emergency communications

From: "James T. McCartney III" <jtmiii@n1nhs.skd.com>  
Date: Thu, 03 Jul 1997 23:53:03 -0400  
To: ss@tapr.org  
Message-ID: <3.0.1.32.19970703235303.0095b860@uisx.skd.com>  
Rendered body type: text/plain

If you want an example of how reliable the birds are for data communications, you need look no further than the little DSS and PrimeStar dishes which are popping up everywhere. These are all digital using MPEG to encode the video stream. Also there is at least one company which is currently offering an internet download service using a bird that is located close to the DSS bird.

James McCartney...

At 09:56 PM 7/3/97 -0500, you wrote:

>  
>btw : could satellite cellular reliable for data communication ?  
>  
>how fast ?  
>  
>On Thu, 3 Jul 1997, Phil Karn wrote:  
>  
> \*\*\*\*\* deleted \*\*\*\*\*

---

## 16. Re: [SS:1547] Re: Is SS The Solution For High Speed Packet Networks?

From: N5RG@aol.com  
Date: Fri, 4 Jul 1997 12:20:37 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <970704122034\_847100504@emout20.mail.aol.com>  
Rendered body type: text/plain

Phil:

Thanks for helping to educate me on how SS works.

>  
> This is another misconception. Spread spectrum does \*not\* inherently  
> require overly expensive clocks any more than SSB or CW require highly  
> accurate and expensive frequency references.

My next question is: How can the receiver acquire and maintain lock on the transmitted sequence without using a highly accurate clock synchronized with the transmitter?

How does the relatively low cost spread spectrum wireless telephone synchronize the receiver to the transmitter?

73, Roy W7IDM, ex N5RG, W5PAG

---

## 17. DSP-93 does SS

From: Frank & Sue Perkins <fperkins@OnRamp.NET>  
Date: Sun, 06 Jul 1997 10:37:58 -0500  
To: dsp-93@tapr.org, ss@tapr.org  
Message-ID: <33BFBD6.670D@mailhost.onramp.net>  
Rendered body type: text/plain

Very rough but working spread spectrum modem for the DSP-93 (well, slightly SS). DSSS, 31-chip gold code, 4X oversampled, DSP correlator, 6250 chips/sec, ~200 bps, for "keyboard" talking. TX not buffered, so you can outrun it if you type fast.

73 Frank WB5IPM  
[Attachment: Ss93\_2z.zip; application/x-zip-compressed; 18,418 bytes]

---

## 18. Message not deliverable

From: Administrator at HQS3  
□ <IMCEACCMail-Administrator+20at+20HQS3@ncr.disa.mil>  
Date: Sun, 6 Jul 1997 12:07:00 -0400  
To: "ss@tapr.org" <ss@tapr.org>  
Message-ID: <199707061609.LAA20333@tapr.org>  
Rendered body type: text/plain

[Empty message body]

---

## 19. Re: [SS:1559] Re:Is SS The Solution For High Speed Packet Networks?

From: Don Lemke <wb9mjn@wb9mjn.ampr.org>  
Date: Fri, 04 Jul 1997 11:05:58 -0500  
To: Phil Karn <karn@qualcomm.com>  
Cc: ss@tapr.org  
Message-ID: <33BD1F66.7CB0@wb9mjn.ampr.org>  
Rendered body type: text/plain

Hi Phil,

I was talking about both inband and out of band emissions, but was unaware of the lenient regulation regarding inband emissions, at 1.2 Ghz and above (which u pointed out in the a prior message).

Regarding:

> Note also that in a true SS/CDMA system you have several independent  
> signals using the same PN code arriving at nearly the same power level  
> but with more than one chip of offset. The demodulator has to be told  
> which signal(s) to track; a passive SAW filter will just give you  
> their sum.

Welp, yea. But, I don't see CDMA as the way to do ham data networks. I see DDMA-WAN as the way. In which case, in each reception period, down each azimuth unit, there is only one DSSS station in range (assuming appropriate power control). So a SAW convolver is a good model here.

I m not prepared to answer all the points below but what the hey, here goes, hi.

- > 1. Length of PN code sequence (size of search space)
- > 2. A-priori knowledge of where to search in code space
- > 3. Degree of parallelism in receiver search hardware.
- >
- > 4. Signal SNR, data  $E_b/N_0$  and data rate. You must dwell on each point
- > in the search space long enough to accumulate enough signal energy to
- > produce a reliable detection.

I m not the Stanford Telecom application engineer. So what follows may be in error.

The STEL2000A, as a few other of the DSSS DMF chip sets, uses a synchronous Chip/Data clock. With N chips per data bit. In the STEL2000a, N can be as large as 64. This takes care of the first 3 points, with regard to being able to acquire in only one data symbol time.

Your 4 th point is tuffer, hi. The DDMA-WAN concept would avoid using any, but strong signal paths. Its not CDMA. Its not mobile radio.

In the SAW convolver the recieve signal is launched from one end of the device, and the despreding signal from the other. Within the device, there is a zone where a broad swath of the interacting signals is multiplied together, and summed over a broad phase range. If this broad swath is only as wide as one data symbol propagation time (in the piezoelectric medium), the two signals need to occur under this transducer at precisely the same time, to cause a despread output. Extrernal circuitry would need to search for this time relationship.

If however the the transducer is made just short of twice as long as the data symbol, and assuming the STEL2000a configuration mentioned above, there will be a time under the transducer, when the despreding signal and received signal will be in code phase. If the transducer was made twice as long, there exists a possibility that two despread signals would occur at the output, one chip time out of phase. And a despread output will occur, no matter what the starting phase of each, as they enter the device. This is because the despreding signal is periodic. It also assumes that the received energy only contains one data signal, per chip code. Which is not the CDMA case, containing multiple data signals, on the same chip code, at varying chip clock phases.

The above paragraph shows how a data signal can be despread with a 1 data symbol time delay. The time delay, can also be looked as an acquisition time. If this can be done with a analog device, does it not follow that it can be done with a digital device, mimicing the same mathematics?

--

73, Don.

AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]  
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu  
Website: <http://www.qth.com/antpanel>

---

## 20. RE: 1589] Message not deliverable

From: Bill Reed <wd0etz@tapr.org>  
Date: Thu, 10 Jul 1997 06:51:48 -0500  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <01BC8CFD.DAE6BAE0@iasc3-113.flash.net>  
Rendered body type: text/plain

-----Original Message-----

From: Administrator.at.HQS3@tapr.org [SMTP:Administrator.at.HQS3@tapr.org]  
Sent: Sunday, July 06, 1997 11:16 AM  
To: ss@tapr.org  
Subject: [SS:1589] Message not deliverable

<< File: MESSAGE.TXT >> An error prevented processing the message to completion. The original message is contained in the attached file MESSAGE.TXT.

---

**21. Re: [SS:1584] Re: emergency communications**

From: N5RG@aol.com  
Date: Wed, 9 Jul 1997 19:45:08 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <970709194506\_-1762336053@emout03.mail.aol.com>  
Rendered body type: text/plain

- > Also, several large LEO satellite cellular systems are on the way
- > (Iridium, Globalstar). When these are operational, we'll have global
- > cellular coverage that cannot be taken out by local storms.

Paul Harvey reported today that five more IRIDIUM satellites were put into orbit today. When this system is operational (projected in 1998), there will be no reason for any point on earth not to have emergency communications, except perhaps for lack of money or equipment. It seems to me that systems like this will give Amateur Radio serious competition for emergency communications traffic.

For complete information on the IRIDIUM system connect to:

<http://www.iridium.com/>

73, Roy W7IDM, ex N5RG & W5PAG

**22. Re: [SS:1592] Re: emergency communications**

From: Glenn Little <glittle@awod.com>  
Date: Thu, 10 Jul 1997 19:40:56 -0400  
To: ss@tpr.org  
Message-ID: <199707102335.TAA15088@sumter.awod.com>  
Rendered body type: text/plain

At 10:50 AM 7/10/97 -0500, you wrote:

```
>
>> Also, several large LEO satellite cellular systems are on the way
>> (Iridium, Globalstar). When these are operational, we'll have global
>> cellular coverage that cannot be taken out by local storms.
>
```

```
>Paul Harvey reported today that five more IRIDIUM satellites were put
>into orbit today. When this system is operational (projected in 1998),
>there will be no reason for any point on earth not to have emergency
>communications, except perhaps for lack of money or equipment. It
>seems to me that systems like this will give Amateur Radio serious
>competition for emergency communications traffic.
```

>For complete information on the IRIDIUM system connect to:

><http://www.iridium.com/>

>73, Roy W7IDM, ex N5RG & W5PAG

When the system gets overloaded to the point that no one can use it, hams will come to the rescue.

|                                   |                  |               |
|-----------------------------------|------------------|---------------|
| Glenn Little                      | glittle@awod.com | QCWA LM 28417 |
| Amateur Callsign: WB4UIV          | wb4uiv@amsat.org | AMSAT LM 2178 |
| QTH: Goose Creek, SC USA (EM92xx) |                  | ARRL          |

### 23. need to acquire plans to build 10 GHz high speed network

From: Chris <critta66@shadow.net>  
Date: Thu, 10 Jul 1997 22:23:19 -0400  
To: ss@tapr.org  
Message-ID: <3.0.32.19970710222316.008502f0@shadow.net>  
Rendered body type: text/plain

Hello fellow ham operators. I need to aquire plans on how to build a 10 ghz tcp/ip networkable system, simmilar to the one in the back of the 1993 arrl book (blue). I want to make a network using ethernet cards and 10 ghz transceivers. Does anyone have plans or know how much it may cost?

thanks

Chris KF4MYN

## 24. Re: [SS:1585] Re: emergency communications

From: Phil Karn <karn@qualcomm.com>  
Date: Thu, 10 Jul 1997 21:31:02 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199707110431.VAA29128@servo.qualcomm.com>  
Rendered body type: text/plain

>btw : could satellite cellular reliable for data communication ?

>how fast ?

All of the LEO constellations now being built or designed are digital. This makes them inherently well suited to data communication.

The data rates vary, from comparable to digital cellular (Globalstar, Iridium) up to megabit rates (Teledesic, though we'll see if that one ever gets built).

Phil

---

## 25. Re: [SS:1586] Re: emergency communications

From: Phil Karn <karn@qualcomm.com>  
Date: Thu, 10 Jul 1997 21:34:43 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199707110434.VAA29136@servo.qualcomm.com>  
Rendered body type: text/plain

>If you want an example of how reliable the birds are for  
>data communications, you need look no further than the little  
>DSS and PrimeStar dishes which are popping up everywhere.

Right. I don't know about PrimeStar, but DSS is 32 Ku-band transponders spread across three co-located satellites. 16 transponders run at 23 megabits/sec and 16 run at 30 megabits/sec (the faster transponders use twice as much RF power). That's an awful lot of bits. Of course, it's all one way.

>Also there is at least one company which is currently offering an  
>internet download service using a bird that is located close to the  
>DSS bird.

DirecPC, not to be confused with DirecTV (DSS), with which it does not share any hardware or facilities. DirecPC is also forward-link only; you must find some other way to send your return traffic. The data rates are also much lower, being something like 400kbps per traffic channel.

Phil

---

## 26. Cool URL's

From: Steve Stroh <steve@strohpublish.com>  
Date: Fri, 11 Jul 1997 06:14:03 -0700  
To: TAPR Spread Spectrum Mailing List <ss@tapr.org>  
Message-ID: <3.0.1.32.19970711061403.0071badc@mail.strohpublish.com>  
Rendered body type: text/plain

Below are some URL's that came up in an Alta Vista search I did recently, and it was suggested that I share them with the TAPR SS Mailing List. They deal with Paul Baran and his consistent message that spectrum scarcity is largely a myth, and can be cured by the application of smart radios. He's been preaching this message for a much longer time than I was aware of.

<http://www.users.on.net/tomk/library/wireless.htm>  
<http://192.160.122.20/baran2.txt>  
[http://www.eff.org/pub/GII\\_NII/Wireless\\_cellular\\_radio/false\\_scarcity\\_baran\\_cngn94.transcript](http://www.eff.org/pub/GII_NII/Wireless_cellular_radio/false_scarcity_baran_cngn94.transcript)

I'm sure this one, a Forbes ASAP article by George Gilder is well known by now, but for completeness, I'll include it here.

<http://www.forbes.com/asap/97/0602/106.htm>

Steve N8GNJ

--  
Steve Stroh, Woodinville, WA USA  
steve@strohpublish.com



---

## 27. Re: [SS:1596] Re: emergency communications

From: Steve Stroh <steve@strohpublish.com>  
Date: Fri, 11 Jul 1997 07:36:53 -0700  
To: ss@tapr.org  
Message-ID: <3.0.1.32.19970711073653.00722e4c@mail.strohpublish.com>  
Rendered body type: text/plain

Phil:

DirecPC now has a two way version- DirecPC Enterprise Edition, which is based on VSAT technology. There was a press release about it on Hughes Network Systems Web site- <http://www.hns.com/News/Press/dpcee.htm>.

Steve N8GNJ

At 23:40 7/10/97 -0500, you wrote:

>>Also there is at least one company which is currently offering an  
>>internet download service using a bird that is located close to the  
>>DSS bird.  
>  
>DirecPC, not to be confused with DirecTV (DSS), with which it does not  
>share any hardware or facilities. DirecPC is also forward-link only;  
>you must find some other way to send your return traffic. The data rates  
>are also much lower, being something like 400kbps per traffic channel.  
>  
>Phil

--

Steve Stroh, Woodinville, WA USA  
steve@strohpublish.com

---

## 28. Re: [SS:1592] Re: emergency communications

From: "Michael R. McGehee" <brainysmurf@silverlink.net>  
Date: Sat, 12 Jul 97 10:32:44 PDT  
To: ss@tapr.org, ss@tapr.org  
Message-ID: <MAPI.Id.0016.007261696e79736d3030304230303042@MAPI.to.RFC822>  
Rendered body type: text/plain

I have unsubscribed from the listserv, yet I am still getting lots of mail. Is there something more I need to do?

Thanks,

Michael R. McGehee  
brainysmurf@silverlink.net

-----

>  
>  
>  
> > Also, several large LEO satellite cellular systems are on the way  
> > (Iridium, Globalstar). When these are operational, we'll have global  
> > cellular coverage that cannot be taken out by local storms.  
>  
> Paul Harvey reported today that five more IRIDIUM satellites were put  
> into orbit today. When this system is operational (projected in 1998),  
> there will be no reason for any point on earth not to have emergency  
> communications, except perhaps for lack of money or equipment. It  
> seems to me that systems like this will give Amateur Radio serious  
> competition for emergency communications traffic.  
>  
> For complete information on the IRIDIUM system connect to:  
>  
> <http://www.iridium.com/>  
>  
> 73, Roy W7IDM, ex N5RG & W5PAG  
>  
>

---

## 29. Re: [SS:1599] Re: emergency communications

From: Tony McConnell <n3jly@erols.com>  
Date: Sun, 13 Jul 1997 20:41:05 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <199707140041.UAA14617@smtp1.erols.com>  
Rendered body type: text/plain

At 12:40 PM 7/12/97 -0500, you wrote:

>I have unsubscribed from the listserv, yet I am still getting lots of mail.

Is there something more I need to do?  
>  
>Thanks,  
>  
>Michael R. McGehee  
>brainysmurf@silverlink.net

Unsubscribe? is that what you have to do to get lots of mail from this group?  
i don't even get ten pieces a week.

---

### 30. Re: [SS:1600] Re: emergency communications

From: Jack Taylor <n7oo@goodnet.com>  
Date: Sun, 13 Jul 1997 18:21:09 -0700 (MST)  
To: ss@tapr.org  
Message-ID: <Pine.GS0.3.95.970713181934.6319A-100000@goodguy>  
Rendered body type: text/plain

On Sun, 13 Jul 1997, Tony McConnell wrote:

> At 12:40 PM 7/12/97 -0500, you wrote:  
> >I have unsubscribed from the listserv, yet I am still getting lots of mail.  
> Is there something more I need to do?  
> >  
> >Thanks,  
> >  
> >Michael R. McGehee  
> >brainysmurf@silverlink.net  
> >  
> Unsubscribe? is that what you have to do to get lots of mail from this group?  
> i don't even get ten pieces a week.

Wow! How come \*you\* get ten pieces a week? All I get is an occasional  
unsubscription request :-)

---

### 31. Re: [SS:1118] Re: Ethernet Interface

From: Charles Brain <chbrain@dircon.co.uk>  
Date: Mon, 14 Jul 1997 16:12:37 +0100  
To: ss@tapr.org  
Message-ID: <33CA41E5.93D3F811@dircon.co.uk>  
Rendered body type: text/plain

Darnell Gadberry wrote:

> I like to would propose the development of a standard TAPR CPU  
> platform  
> with RTEMS support and RIP routing added to the RTEMS kernel. The  
> Thoughts?  
>

Hello Darnell,

I know you posted this a long time ago, but did you ever investigate  
RTEMS any  
further? I have been trying to build it using a i386 pc target without  
too much luck.

The go32 support is broken basically and the guy that did it can't  
remeber what he  
did and doesn't use it anymore (ie he doesn't want anymore to do with  
it).

OAR are not too keen to give support without payment (to be expected)  
and most of the  
people that do use it tried the tests and that is about all they have  
ever done with it.

- CUL Charles G4GU0

---

### 32. 10Ghz and more

From: dan <dan@lakeweb.net>  
Date: Mon, 14 Jul 1997 09:52:49 -0700  
To: ss@tapr.org  
Message-ID: <33CA5961.7020@lakeweb.net>  
Rendered body type: text/plain

hello spread spectrum,

I have put the first page of my projects up at:

<http://www.lakeweb.com/dbLabs/spectrumAnalyzer/intro.shtml>

Coming up, I have purchased a 'perfect 10/grundig' down converter for the Ku band. The LO in this unit puts the 10Ghz band about perfectly in the image. This thing now sells for \$31.50! I am figuring to replace the throat of the feed horn with a little larger piece of copper tubing and gimmick the inter-digital filter and it should work very well. Has anyone else thought of this or done it?

It should make a great point to point link for ham PCS systems. Is anyone doing work on wide-band digital for this kind of stuff?

My first post to this list, I have been listening for a few weeks now.

Best, Dan. <http://www.lakeweb.com/>

---

### 33. Re: [SS:1602] Re: Ethernet Interface

From: darnell@binmedia.com (Darnell Gadberry)  
Date: Mon, 14 Jul 97 10:24:02 -0700  
To: <ss@tapr.org>  
Message-ID: <19970714171559494.AAA187@[206.117.173.2]>  
Rendered body type: text/plain

>Darnell Gadberry wrote:  
>  
>> I like to would propose the development of a standard TAPR CPU  
>> platform  
>> with RTEMS support and RIP routing added to the RTEMS kernel. The  
>> Thoughts?  
>>  
>  
>Hello Darnell,  
>  
>I know you posted this a long time ago, but did you ever investigate  
>RTEMS any  
>futher? I have been trying to build it using a i386 pc target without  
>too much luck.  
>  
>The go32 support is broken basically and the guy that did it can't  
>remeber what he  
>did and doesn't use it anymore (ie he doesn't want anymore to do with  
>it).  
>  
>OAR are not too keen to give support without payment (to be expected)  
>and most of the  
>people that do use it tried the tests and that is about all they have  
>ever done with it.  
>  
>- CUL Charles G4GUO  
>

Charles,

My experience with RTEMS has been similar. Alas, we have given up on using it as a tool in any of our products.

I am currently preparing a OS feature matrix which I plan on posting to the list in the next few days. Additionally, we have decided to make the design our DEC StrongARM RISC CPU based communications card freely available to TAPR or any other HAM organization that wants to use it. We need to clean up the schematics and write some (lots!) documentation. I hope that we will be able to post a complete reference kit to our web site before the end of this month.

Perhaps we can help inspire some real research and experimentation and not just more protracted debate about the minutiae of implementing a SS - TCP/IP - Data/Voice communications system.

- darnell gadberry KE6UCL  
binaryMedia Communications  
[darnell@binmedia.com](mailto:darnell@binmedia.com)

---

### 34. Re: 10Ghz and more

From: Don Lemke <wb9mjn@wb9mjn.ampr.org>  
Date: Mon, 14 Jul 1997 17:31:09 -0500

To: ss@tapr.org  
Message-ID: <33CAA8AC.79A0@wb9mjn.ampr.org>  
Rendered body type: text/plain

Hi Dan,

Where does one purchase these devices? I've actually heard about the Perfect 10 previously, but a web search only rendered information on pornography sites!

--

73, Don.

AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]  
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu  
Website: <http://www.qth.com/antpanel>

---

### 35. Re: [SS:1602] Re: Ethernet Interface

From: darnell@binmedia.com (Darnell Gadberry)  
Date: Mon, 14 Jul 97 15:52:37 -0700  
To: <ss@tapr.org>  
Message-ID: <19970714224435394.AAA190@[206.117.173.2]>  
Rendered body type: text/plain

>Darnell Gadberry wrote:  
>  
>> I like to would propose the development of a standard TAPR CPU  
>> platform  
>> with RTEMS support and RIP routing added to the RTEMS kernel. The  
>> Thoughts?  
>>  
>  
>Hello Darnell,  
>  
>I know you posted this a long time ago, but did you ever investigate  
>RTEMS any  
>futher? I have been trying to build it using a i386 pc target without  
>too much luck.  
>  
>The go32 support is broken basically and the guy that did it can't  
>remeber what he  
>did and doesn't use it anymore (ie he doesn't want anymore to do with  
>it).  
>  
>OAR are not too keen to give support without payment (to be expected)  
>and most of the  
>people that do use it tried the tests and that is about all they have  
>ever done with it.  
>  
>- CUL Charles G4GUO

Charles,

My experience has been similar. Unfortunately, there are very few full-featured, low-cost embedded OS implementations available with complete TCP/IP support. I have done a bit more research on the OS issue and have compiled a table of alternative Operating Systems for the TAPR networking platform.

Here goes. They are listed in no particular order.

Linux

Pros:

Runs on a variety of  
CPU architectures.

Well Documented

Very complete TCP/IP  
support.

Free

GNU development tools are free and readily available. I

could

linker and craft a CD-ROM that contains the required compiler, debugger.

Cons:

Free (Free stuff is usually worth exactly what you pay for it.)

No central authority for major bug fixes. Who do we point the finger at when an obscure bone-crunching bug brings down one of our major backbone routers?

Relatively large memory footprint for this kind of embedded application.

Windows CE

Pros:

Subset of the Win32 API. This means that we can leverage an incredible body of software that has been written for Windows95 and NT.

Java OS

Pros:

Written mostly in Java. Very easy to port to a new platform.

Cons:

Despite the hype. Java does not run very well on garden variety 20 MIPS 32-bit processors. Truly acceptable performance requires 100 Mhz or better 486 or Pentium class CPUs. Notice that all of the commercially announced set-top boxes running Java OS employ a > 120 Mhz RISC CPU.

This probably makes simple home construction of a copy of the reference platform

Needless to say, this dramatically increases the complexity and cost of developing an inexpensive reference platform

VxWorks/Tornado

PSos

Other possible choices for an OS include: Windows CE (I have been quoted around \$65 per copy from AnnaSoft. They are the Microsoft authorized supplier of Windows OS products to small OEM customers.)

### 36. Re: [SS:1590] Re:Is SS The Solution For High Speed Packet Networks?

From: Phil Karn <karn@qualcomm.com>  
 Date: Mon, 14 Jul 1997 16:35:09 -0700 (PDT)  
 To: ss@tapr.org  
 Cc: karn@qualcomm.com  
 Message-ID: <199707142335.QAA15322@servo.qualcomm.com>  
 Rendered body type: text/plain

> Welp, yea. But, I don't see CDMA as the way to do ham data  
 > networks. I see DDMA-WAN as the way. In which case, in each reception  
 > period, down each azimuth unit, there is only one DSSS station in range

This is a rather wasteful use of spectrum.

> Your 4th point is tuffer, hi. The DDMA-WAN concept would avoid  
 > using any, but strong signal paths. Its not CDMA. Its not mobile radio.

Ditto. Consider the interference your strong signals cause others.

> In the SAW convolver the receive signal is launched from one end  
> of the device, and the despreading signal from the other. Within the  
> device, there is a zone where a broad swath of the interacting signals  
> is multiplied together, and summed over a broad phase range. If this  
> broad swath is only as wide as one data symbol propagation time (in the  
> piezoelectric medium), the two signals need to occur under this  
> transducer at precisely the same time, to cause a despread output.  
> External circuitry would need to search for this time relationship.

My understanding of SAW devices is that they have their "despreading signals" hard-encoded into the structure of the device. Essentially they are passive finite-impulse-response filters. Mathematically, they're discrete in time but analog in amplitude. And while they're a very cheap way to do certain filters, they do have their limits. I believe, for example, that SAW convolvers are limited to relatively short PN codes. Codes of the length commonly used with CDMA are impractical in SAW.

In any event, a SAW is simply an implementation of the same mathematical operations that can be done entirely digitally. The same laws of mathematics still apply.

> The above paragraph shows how a data signal can be despread  
> with a 1 data symbol time delay. The time delay, can also be looked as  
> an acquisition time. If this can be done with an analog device, does it  
> not follow that it can be done with a digital device, mimicing the same  
> mathematics?

Well sure, in the sense that the post-multiplication integration is performed over a symbol interval. A longer integration would strip off the baseband modulation! And this again assumes a very short PN code that can fit into the SAW. Such a short PN code could also be acquired very quickly in a purely digital correlator. But such short codes are not very useful for CDMA (necessary for decent spectral efficiency), nor are they good at suppressing intersymbol or co-channel interference. You're giving up many of the reasons to use spreading in the first place.

Regardless of what kind of correlator you use, though, you still have to recover carrier phase (if coherent demodulation is used) and symbol timing.

Phil

---

### 37. Re: [SS:1606] Re: Ethernet Interface

From: darnell@binmedia.com (Darnell Gadberry)  
Date: Mon, 14 Jul 97 18:17:35 -0700  
To: <ss@tapr.org>  
Message-ID: <19970715010933902.AAA192@[206.117.173.2]>  
Rendered body type: text/plain

Oops,

Please ignore my last partial post regarding operating systems. It was a VERY early work-in-progress that I accidentally mailed.

- darnell gadberry KE6UCL  
binaryMedia Communications  
darnell@binmedia.com

---

### 38. SS Radios

From: eric <epaolin@mail5.clio.it>  
Date: Tue, 15 Jul 1997 04:12:41 +0100  
To: ss@tapr.org  
Message-ID: <1343182535-19801950@mail5.clio.it>  
Rendered body type: text/plain

Has an alternate to FREEWAVE'S SS radio been found for use as an experimental amateur platform?

Eric  
KB2YAM

---

### 39. Re: [SS:1593] Re: emergency communications

From: Phil Karn <karn@qualcomm.com>  
Date: Mon, 14 Jul 1997 20:43:48 -0700 (PDT)  
To: ss@tapr.org

Message-ID: <199707150343.UAA17395@servo.qualcomm.com>  
Rendered body type: text/plain

>When the system gets overloaded to the point that no one can use it, hams  
>will come to the rescue.

Yup, by having more of our underutilized spectrum transferred to the commercial guys who are obviously in a much better position to use it efficiently, and to provide emergency services to the public.

I can't believe how many hams keep making the "commercial services are overloaded in an emergency" argument without realizing how dangerous it is.

Phil

---

## 40. Re:Is SS The Solution For High Speed Packet Networks?

From: Don Lemke <wb9mjin@wb9mjin.ampr.org>  
Date: Mon, 14 Jul 1997 23:05:05 -0500  
To: Phil Karn <karn@qualcomm.com>  
Cc: ss@tapr.org  
Message-ID: <33CAF6F1.5919@wb9mjin.ampr.org>  
Rendered body type: text/plain

Hi Phil,

> > Welp, yea. But, I don't see CDMA as the way to do ham data  
> > networks. I see DDMA-WAN as the way. In which case, in each reception  
> > period, down each azimuth unit, there is only one DSSS station in range  
>  
> This is a rather wasteful use of spectrum.

How so? DDMA-WAN is narrower in BW than a CDMA system at the same baud rate. Since it uses antenna off-boresite rejection to allow for a lesser processing gain. And lesser processing gain results in a narrower bandwidth signal. But, its really not spectrum alone that is the whole consideration. Its Spectrum-Time-Area for a given BER.

>  
> > Your 4th point is tuffer, hi. The DDMA-WAN concept would avoid  
> > using any, but strong signal paths. Its not CDMA. Its not mobile radio.  
>  
> Ditto. Consider the interference your strong signals cause others.

No more than an omni CDMA with the same ERP. At the same data rate (not my intent) the DDMA-WAN would have even a lesser interference area than Omni CMDA. Since the receive antenna directivity would allow for lower transmitter power. Again, its Spectrum-Time-Area. A broadbandwidth signal in a small area, for a short time, can be equivalent in resource utilization as a narrowbandwidth, large area, long duration signal.

The FCC considers that for every 3 dB increase in antenna gain, only a 1 dB decrease in power level is needed to maintain the same illumination contours. If, one drops the power to only what one needs to do the communication, for every 3 dB gain in transmitter antenna gain, one can decrease illuminated area by 2 dB. And this does not even consider the second 3 dB power reduction possible if the receive antenna gain tracks the transmitter, in the system design.

> My understanding of SAW devices is that they have their "despreading  
> signals" hard-encoded into the structure of the device. Essentially they  
> are passive finite-impulse-response filters. Mathematically, they're  
> discrete in time but analog in amplitude. And while they're a very  
> cheap way to do certain filters, they do have their limits.

While it is certainly possible to make a fix coded SAW despreaders, there are such devices as Saw Convolvers. Which have two inputs and an output which represents the convolution of the two inputs.

> I believe,  
> for example, that SAW convolvers are limited to relatively short PN  
> codes. Codes of the length commonly used with CDMA are impractical in  
> SAW.

Yes, this is true. Which is why I used the SAW device only as a model. To prove that the Matched Filter Technique could decode in one symbol time.

- > But such short codes are
- > not very useful for CDMA (necessary for decent spectral efficiency),
- > nor are they good at suppressing intersymbol or co-channel
- > interference. You're giving up many of the reasons to use spreading
- > in the first place.

Which is why there is directivity involved. To make up for the short SS code. I m assuming that by "intersymbol" u really are meaning to say delay spread. I m really not trying to do CDMA at all. This is different. Its DDMA, using SS for some additional delay spread help, and extra cochannel protection since antennas are not perfect.

- > Regardless of what kind of correlator you use, though, you still have
- > to recover carrier phase (if coherent demodulation is used) and symbol
- > timing.

Yep, this is where im guessing. Am i misunderstanding Stanford Telecom regarding the lock-up time, or is the this timing derived from the DMF correlator. The CHIP clock frequency is an integer multiple of the Symbol clock? The output of the IC is data, with clock.

Here is some stuff from the STEL2000A data sheet, regarding its "Symbol Tracking Processor":

"The output of the Power Detector Block represents the signal power during each chip period. Ideally the output will have a high peak value once per symbol (i.e., once per PN code cycle) when the code sequence of the received signal in the PN Matched Filter is the same as (and is aligned in time with) the reference PN code used in the PN Matched Filter. At that instant, the I and Q channel outputs of the PN Matched Filter are, theoretically, the optimally despread I and Q symbols."

So, I see this is similar to the SAW matched filter technique. Some time during the period, the convolution reaches a correlation peak power level, which is coincident with the time alignment of the received signal, and the local PN sequence. If the symbol clock is aligned with this time, its aligned with the received data symbol. Does this make sense?

Regarding poor signal to noise situations, they say the chip has a "flywheel circuit". It apparently, as i read this, puts a window around the expected next period transistion, and ignores transistions outside the window.

This chip is used in allot of the WLAN products. Instead of antenna directivity, the WLAN has a concrete block wall between neighboring (in the next office over) systems. In combination with with small DSSS code, they can coexist. Instead of a concrete block wall, I m proposing hams use a azimuthal scanning antenna, along with the small DSSS code. This way each communication (between two network neighbors) is protected. This allows a higher data rate in a local area, and respectable MAN thruputs.

I think IS-95 model of CDMA is great for what it was designed for. Which is loading the spectrum with the maximum numbers for low data rate omni antenna user stations. And I think Ham Radio should do a TDD 6 meter, or 420 Mhz version of this system, to support omnipresent omnilinked voice communications! With our low levels of users, some of that capacity could even be put to doing the links, right there in the same spectrum!

The IS-95 system goal is far different from the high data rate-networking, mostly stationary user that Ham TCPIP Packet Radio represents. Which is what i see DDMA-WAN as a viable solution to.

--

73, Don.

AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]  
 Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu  
 Website: <http://www.qth.com/antpanel>



## 41. Re: [SS:1610] Re: emergency communications

From: Dewayne Hendricks <dewayne@warpspeed.com>  
Date: Tue, 15 Jul 1997 00:23:34 -0700  
To: ss@tapr.org  
Message-ID: <v03110704aff0d3b6e0dd@[204.118.182.22]>  
Rendered body type: text/plain

At 10:46 PM -0500 7/14/97, Phil Karn wrote:

>>When the system gets overloaded to the point that no one can use it, hams  
>>will come to the rescue.

>

>Yup, by having more of our underutilized spectrum transferred to the  
>commercial guys who are obviously in a much better position to use it  
>efficiently, and to provide emergency services to the public.

>

Phil is quite correct in his assertion above. This recently happened when the FCC reallocated the 2305-2310 MHz part of our existing secondary allocation at 2300-2310 MHz to the new Wireless Communications Service (WCS) on a primary basis. This spectrum was then put up for auction with great fanfare earlier this year and companies such as Metricom for instance were awarded licenses for this new WCS service after the auction.

>I can't believe how many hams keep making the "commercial services are  
>overloaded in an emergency" argument without realizing how dangerous  
>it is.

I agree. It is silly to continue to put forth the notion that the commercial sector will not learn from experience and take steps to insure that adequate system capacity is available for such situations.

-- Dewayne

--

~~~~~  
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>
Fax: (510) 770-9854 !
~~~~~

## 42. Re: [SS:1587] Re: Is SS The Solution For High Speed Packet Networks?

From: Phil Karn <karn@qualcomm.com>  
Date: Thu, 10 Jul 1997 22:11:50 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199707110511.WAA29388@servo.qualcomm.com>  
Rendered body type: text/plain

>My next question is: How can the receiver acquire and maintain lock on the  
>transmitted sequence without using a highly accurate clock synchronized  
>with the transmitter?

Depends on the specific system, of course (remember "SS" is a generic term). I'll describe direct sequence, as it's the system I'm most familiar with.

If the acquisition code is fairly short, as it is for both IS-95 CDMA (32768 chips) and GPS (1023 chips), then the receiver can search the entire PN sequence space fairly rapidly, e.g., in a few seconds.

This is done before acquiring carrier phase, since you can't see the carrier (or any other part of the signal) until you've despread it. So generally you run the RF signal through a multiplier (mixer) driven by a clocked PN generator, bandpass filter the mixer output around the the expected carrier frequency (with the filter allowing for doppler shift, etc) and slew the clock driving the PN generator until you see a lot of energy suddenly pop up in the bandpass filter. (The energy detector can be as simple as an AM envelope detector).

When this happens, you begin code tracking in one of several ways. They're all variants of classic phase lock loops, though in this case the "phase comparator" is comparing code phase, not sine wave phase. Typically you have one correlator running 1/2 chip late and another 1/2 chip early with bandpass filters and energy detectors on both.

Your loop error signal is simply the filtered difference in energy of these two detectors; when you're right on the correct code phase, the two detectors produce equal energy and the feedback signal is zero.

You must stay within  $\pm 1/2$  chip to retain lock; if you fall out, you have to search again. It's not quite like a normal PLL tracking a sine wave where you get a meaningful error signal from your phase detector over most of the "search space" (signal phase).

To save hardware, you can use a single despread and filter and "tau dither" it  $\pm 1/2$  chip from nominal timing; this is essentially a timeshared despread. It doesn't perform as well, though.

Once you have code phase, you can despread the signal and demodulate it as though it were narrowband to start with. E.g., if it is coherent BPSK, you'd use a Costas loop or squaring loop to recover carrier phase and the modulation.

>How does the relatively low cost spread spectrum wireless telephone  
>synchronize  
>the receiver to the transmitter?

IS-95 CDMA is a bit more complex than I described. There is a significant "pilot" component from the cell that is essentially just what I described above -- a 32768-chip PN sequence on a carrier with no other modulation. The trackers in the phone respond only to this signal. But instead of locking a PLL to the despread carrier, they simply filter it and use the despread pilot itself as the local carrier reference. This is nice for dealing with multipath fading where carrier phase can otherwise change too rapidly for a PLL to keep up.

It's fully analogous to a nonspread BPSK system with residual carrier that JPL still uses on deep space probes (e.g., Mars Pathfinder) when the C/N0 ratio is too weak and the relative frequency uncertainty too great to permit efficient recovery of a carrier reference from a fully suppressed ( $\pm 90$  deg phase deviation) signal.

But pilots cost power, so you want to minimize them. In the case of the IS-95 forward (cell->mobile) link a single pilot can be shared by all the users in the cell, so it isn't unreasonable to have a pilot that's a few dB stronger than the actual traffic signals directed at each user.

The actual traffic is spread on what amount to "subcarriers" on top of the main carrier. There are 64 of these subcarriers, which are in fact Walsh functions instead of sine waves. One, Walsh function zero, is in fact DC, which is reserved for the pilot "carrier". Several more are used for overhead (paging, etc), with typically 61 available for user traffic. But all the timing is synchronized with the spreading on the pilot, so once the phone has acquired the pilot it has all of the timing it needs to despread and decode everything else.

Phil

---

### 43. Re: [SS:1606] Re: Ethernet Interface

From: Christopher Chow <critta66@shadow.net>  
Date: Tue, 15 Jul 1997 08:41:25 -0400 (EDT)  
To: ss@tapr.org  
Cc: ss@tapr.org  
Message-ID: <Pine.SOL.3.91.970715083840.12689A-100000@hyper>  
Rendered body type: text/plain

On Mon, 14 Jul 1997, Darnell Gadberry wrote:

```
> >Darnell Gadberry wrote:
> >
> >> I like to would propose the development of a standard TAPR CPU
> >> platform
> >> with RTEMS support and RIP routing added to the RTEMS kernel. The
> >> Thoughts?
> >>
> >>
> >Hello Darnell,
> >
> >I know you posted this a long time ago, but did you ever investigate
> >RTEMS any
> >futher? I have been trying to build it using a i386 pc target without
> >too much luck.
> >
> >The go32 support is broken basically and the guy that did it can't
> >remeber what he
> >did and doesn't use it anymore (ie he doesn't want anymore to do with
```

```

> >it).
> >
> >OAR are not too keen to give support without payment (to be expected)
> >and most of the
> >people that do use it tried the tests and that is about all they have
> >ever done with it.
> >
> >- CUL Charles G4GU0
>
> Charles,
>
> My experience has been similar. Unfortunately, there are very few
> full-featured, low-cost embedded OS implementations available with
> complete TCP/IP support. I have done a bit more
> research on the OS issue and have compiled a table of alternative
> Operating Systems for
> the TAPR networking platform.
>
> Here goes. They are listed in no particular order.
>
>
> Linux
>
> Pros:
>
> Runs on a variety of
> CPU architectures.
>
> Well Documented
>
> Very complete TCP/IP
> support.
>
> Free
>
> GNU development tools are free and readily available. I
> could
> craft a CD-ROM that contains the required compiler,
> linker and
> debugger.
>
> Cons:
>
> Free (Free stuff is usually worth exactly what you pay
> for it.)
>
> No central authority for major bug fixes. Who do we
> point the finger
> at when an obscure bone-crunching bug brings down one
> of our major
> backbone routers?
>
> Relatively large memory footprint for this kind of
> embedded application.
>
>
> Windows CE
>
> Pros:
>
> Subset of the Win32 API. This means that we can
> leverage an incredible
> body of software that has been written for Windows95
> and NT.
>
> Java OS
> Pros:
>
> Written mostly in Java. Very easy to port to a new
> platform.
>
> Cons:
>
> Despite the hype. Java does not run very well on garden
> variety 20 MIPS
> 32-bit processors. Truly acceptable performance
> requires 100 Mhz or
> better 486 or Pentium class CPUs. Notice that all of
> the commercially
> announced set-top boxes running Java OS employ a > 120
> Mhz RISC CPU.

```

> This probably makes simple home construction of a copy  
> of the reference platform  
> Needless to say, this dramatically increases the  
> complexity and cost of developing an inexpensive reference platform  
> VxWorks/Tornado  
>  
> PSos  
>  
>  
>  
>  
>  
> Other possible choices for an OS include: Windows CE (I have been quoted  
> around \$65 per copy from AnnaSoft. They are the Microsoft authorized  
> supplier of Windows OS products to small OEM customers.)  
>  
>  
Hello, i havent followed this thread but if you are looking for a small  
tcp/ip GUI kernal, QNX is one of the most popular. Windows CE? if you are  
running a network i dont u nderstand how you could implemnt Windows CE...  
Its like saying i want to start a network using netwon OS.

Qnx microkernal is a very small gui kernel .

73,kf4myn

---

#### 44. Message not deliverable

From: Administrator at HQS3  
□ <IMCEACCMail-Administrator+20at+20HQS3@ncr.disa.mil>  
Date: Tue, 15 Jul 1997 09:52:00 -0400  
To: "ss@tapr.org " <ss@tapr.org>  
Message-ID: <199707151356.IAA12400@tapr.org>  
Rendered body type: text/plain  
[Empty message body]

---

#### 45. Re: [SS:1613] Re: Is SS The Solution For High Speed Packet Networks?

From: N5RG@aol.com  
Date: Tue, 15 Jul 1997 12:20:20 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <970715121818\_-90490417@emout13.mail.aol.com>  
Rendered body type: text/plain  
Phil:

> >My next question is: How can the receiver aquire and maintain lock on the  
  
> >transmitted sequence without using a highly accurate clock synchronized  
> >with the transmitter?  
>  
> Depends on the specific system, of course (remember "SS" is a generic  
term).  
> I'll describe direct sequence, as it's the system I'm most familar with.  
>

Thanks for taking the time to give me the info. It did greatly help me  
to understand how it works.

73, Roy W7IDM, ex N5RG & W5PAG

---

#### 46. Re: [SS:1614] Re: Ethernet Interface

From: "Lee W. Fry" <lfry@mindspring.com>  
Date: Tue, 15 Jul 1997 21:19:35 -0400  
To: ss@tapr.org  
Message-ID: <2.2.32.19970716011935.01863e54@mindspring.com>  
Rendered body type: text/plain  
At 07:38 AM 7/15/97 -0500, Christopher Chow wrote:

>Hello, i havent followed this thread but if you are looking for a small  
>tcp/ip GUI kernal, QNX is one of the most popular. Windows CE? if you are  
>running a network i dont u nderstand how you could implemnt Windows CE...  
>Its like saying i want to start a network using netwon OS.  
>  
>

>Qnx microkernel is a very small gui kernel .  
>

I just saw an ad in the new Byte magazine that QNX is offering a demo of a system that will boot from a 1.44 floppy, do tcp/ip, http etc. See <http://www.qnx.com/iat/index.html>

I don't know what the developer and run-time license costs for QNX are though.

Standard disclaimer - no connection with QNX - yadda yadda....

Lee - AA0JP

---

## 47. Re: [SS:1617] Re: Ethernet Interface

From: darnell@binmedia.com (Darnell Gadberry)  
Date: Wed, 16 Jul 97 09:04:42 -0700  
To: <ss@tapr.org>  
Message-ID: <19970716155643329.AAB186@[206.117.173.2]>  
Rendered body type: text/plain

>  
>I just saw an ad in the new Byte magazine that QNX is offering a demo of a  
>system that will boot from a 1.44 floppy, do tcp/ip, http etc. See  
><http://www.qnx.com/iat/index.html>  
>  
>I don't know what the developer and run-time license costs for QNX are  
>though.  
>  
>Standard disclaimer - no connection with QNX - yadda yadda....  
>  
>Lee - AA0JP  
>

Lee,

I downloaded the sample and it runs quite nicely. It does indeed boot from a 1.44Mb floppy. However, the OS decompresses its binaries into RAM before execution. The system requires approximately 6MB of free RAM to operate.

Last time we checked the QNX OS was somewhere around 1,500 for a development system with runtime licenses at approximately 35 - 50 bucks in small quantities.

- darnell gadberry KE6UCL

---

## 48. Re: [SS:1606] Re: Ethernet Interface

From: Lyle Johnson <lylej@azstarnet.com>  
Date: Wed, 16 Jul 1997 18:58:03 -0700  
To: ss@tapr.org  
Message-ID: <3.0.32.19970716185648.006f7b28@pop.azstarnet.com>  
Rendered body type: text/plain

> Linux  
> Pros:  
>  
> Runs on a variety of  
> CPU architectures.  
>  
> Well Documented  
>  
> Very complete TCP/IP  
> support.  
>  
> Free  
>  
> GNU development tools are free and readily available. I  
could  
> craft a CD-ROM that contains the required compiler,  
linker and  
> debugger.  
>  
> Cons:  
>  
> Free (Free stuff is usually worth exactly what you pay  
for it.)

We use this at work for deploying systems that cost roughly \$1,000,000. It works well

```

>
>           No central authority for major bug fixes. Who do we
point the finger
>           at when an obscure bone-crunching bug brings down one of
our major
>           backbone routers?

```

Why point fingers? The \*problem\* with Win95, for example, is that you can point fingers all you want, but NO ONE CARES! The beauty of a Linux or other freely available O/S is that you have the source so if something goes wrong, rather than trying to find someone to point a finger at, you find it, fix it and share the fix.

Fortunately, because this is amateur radio, if a major node goes down, no one loses any revenue :-)

```

>           Relatively large memory footprint for this kind of
embedded application.

```

Memory is a heck of a lot cheaper than most royalties for O/S that you \*have\* to pay to get fixed instead of free ones that you can fix yourself, and learn in the process.

```

>   Windows CE
>
>           Pros:
>
>           Subset of the Win32 API. This means that we can leverage
an incredible
>           body of software that has been written for Windows95 and
NT.

```

\$65 and how seriously do you think anyone at Microsoft will want to fix a reported bug from as small a user base as we'd ever be?

```

>   Java OS
>           Pros:
>           Written mostly in Java. Very easy to port to a new
platform.
>
>           Cons:
>           Despite the hype. Java does not run very well on garden
variety 20 MIPS
>           32-bit processors. Truly acceptable performance requires
100 Mhz or
>           better 486 or Pentium class CPUs. Notice that all of the
commercially
>           announced set-top boxes running Java OS employ a 120 Mhz
RISC CPU.
>           This probably makes simple home construction of a copy
of the reference
>           platform
>           Needless to say, this dramatically increases the
complexity and cost
>           of developing an inexpensive reference platform

```

How fast does the non-trap-handler code have to be? The OS is written in C++/ASM, the applications are written in JAVA. Free-ware, clean-room JAVA O/S ports now exist. You trade speed for stability and portability. JIT compilation significantly speeds up execution speed of JAVA apps. Any compiler on any machine turns out the same byte-codes, so even Mac owners can contribute to the effort!

60 MIP processors (e.g., Hitachi SH-3) are \$20, including associative cache, etc. The processor plus lots of RAM is less than the license fee of commercial O/Ses... I'm not sure how much a DEC STRONGArm processor costs (200 MIPS) but it isn't very much...

```

> VxWorks/Tornado
>
>   PSos
>
>Other possible choices for an OS include: Windows CE (I have been quoted
>around $65 per copy from AnnaSoft. They are the Microsoft authorized
>supplier of Windows OS products to small OEM customers.)
>

```

Cheers,

Lyle

---

## 49. Re: [SS:1619] Re: Ethernet Interface

From: "N0UDZ (Dennis Chambers)" <n0udz@dialnet.net>  
Date: Thu, 17 Jul 1997 07:15:12 -0500 (CDT)  
To: ss@tapr.org  
Message-ID: <Pine.LNX.3.95.970717070622.11915A-100000@shell.dialnet.net>  
Rendered body type: text/plain

I will concede that when all facts are considered Linux is most suited to the running of backbone network nodes, I do think that the runner up would be OS/2 which was not even listed. OS/2's only major drawback that I can see is that it does not yet have a micro-kernel architecture to allow it to break the Intel x86 architecture, but it is scheduled to be included in the next release of OS/2 Warp.

The preceding has is my \$.02 MSRP. All applicable taxes and fees paid. :)  
Dennis Chambers  
N0UDZ

On Wed, 16 Jul 1997, Lyle Johnson wrote:

```
> > Linux
> > Pros:
> >
> > Runs on a variety of
> > CPU architectures.
> >
> > Well Documented
> >
> > Very complete TCP/IP
> > support.
> >
> > Free
> >
> > GNU development tools are free and readily available. I
> could
> > craft a CD-ROM that contains the required compiler,
> linker and
> > debugger.
> >
> > Cons:
> >
> > Free (Free stuff is usually worth exactly what you pay
> for it.)
>
> We use this at work for deploying systems that cost roughly $1,000,000. It
> works well
>
> >
> > No central authority for major bug fixes. Who do we
> point the finger
> > at when an obscure bone-crunching bug brings down one of
> our major
> > backbone routers?
>
> Why point fingers? The *problem* with Win95, for example, is that you can
> point fingers all you want, but NO ONE CARES! The beauty of a Linux or
> other freely availbe O/S is that you have the source so if something goes
> wrong, rather than trying to find someone to point a finger at, you find
> it, fix it and share the fix.
>
> Fortunately, because this is amateur radio, if a major node goes down, no
> one loses any revenue :-)
>
> >
> > Relatively large memory footprint for this kind of
> embedded application.
>
> Memory is a heck of a lot cheaper than most royalties for O/S that you
> *have* to pay to get fixed instead of free ones that you can fix yourself,
> and learn in the proecess.
>
>
> > Windows CE
> >
> > Pros:
```

```

> >
> > Subset of the Win32 API. This means that we can leverage
> an incredible
> > body of software that has been written for Windows95 and
> NT.
>
> $65 and how seriously do you think anyone at MicroSoft will want to fix a
> reported bug from as small a user base as we'd ever be?
>
> > Java OS
> > Pros:
> > Written mostly in Java. Very easy to port to a new
> platform.
> >
> > Cons:
> > Despite the hype. Java does not run very well on garden
> variety 20 MIPS
> > 32-bit processors. Truly acceptable performance requires
> 100 Mhz or
> > better 486 or Pentium class CPUs. Notice that all of the
> commercially
> > announced set-top boxes running Java OS employ a 120 Mhz
> RISC CPU.
> > This probably makes simple home construction of a copy
> of the reference
> > platform
> > Needless to say, this dramatically increases the
> complexity and cost
> > of developing an inexpensive reference platfor
>
> How fast does the non-trap-handler code have to be? The OS is written in
> C++/ASM, the applications are written in JAVA. Free-ware, clean-room JAVA
> O/S ports now exist. You trade speed for stability and portablility. JIT
> compilation significantly speeds up execution speed of JAVA apps. Any
> compiler on any machine turns out the same byte-codes, so even Mac owners
> can contribute to the effort!
>
> 60 MIP processors (e.g., Hitachi SH-3) are $20, incoluding associative
> cache, etc. The processor plus lots of RAM is less than the license fee of
> commercial O/Ses... I'm not sure how much a DEC STRONGArm processor costs
> (200 MIPS) but it isn't very much...
>
> > VxWorks/Tornado
> >
> > PSos
> >
> > Other possible choices for an OS include: Windows CE (I have been quoted
> > around $65 per copy from AnnaSoft. They are the Microsoft authorized
> > supplier of Windows OS products to small OEM customers.)
> >
>
> Cheers,
>
> Lyle
>

```

## 50. Re: [SS:1618] Re: Ethernet Interface

```

From: "James T. McCartney III" <jtmiii@uisx.skd.com>
Date: Thu, 17 Jul 1997 09:19:39 -0400
To: ss@tapr.org
Message-ID: <3.0.1.32.19970717091939.00995880@uisx.skd.com>
Rendered body type: text/plain

```

Yup, QNX is YAEOS (yet another embedded OS) which is widely available. Others are PSOS, VxWorks, Lynx and a host of others. Usually, these OS's are fairly full featured, offer both physical or virtual memory support, TCP/IP stacks (of varying quality I might add) and the ability to get down and dirty with the hardware. Most started prior to the VME bus, grew up on VME, and are now migrating to have board support for PMD/PCI modules.

As they are typically sold into environments where either

- a) "We are developing a high volume product, which we will sell for around (a few hundred to a few thousand) bucks, a high development license is not an issue. After all, if we spend 10 grand, it saves us at least twice that in development time/cost."

or

- b) "We are developing a custom soulution for a customer who needs to do <insert difficult task with custom hw/sw here> and since



the cost of the system is part of a <\$100,000 to multi-million> job, cost is a concern, but not a driving issue. After all, if we spend 10 grand, it saves us at least twice that in development time/cost.'

So these OS offerings are not for the faint of heart. They are as a rule very good workhorses, but don't expect them to come cheap. BTW, why does everyone fawn over Linux when FreeBSD is just as viable at the same price?

James

At 11:09 AM 7/16/97 -0500, you wrote:

```
>>
>>I just saw an ad in the new Byte magazine that QNX is offering a demo of a
>>system that will boot from a 1.44 floppy, do tcp/ip, http etc. See
>>http://www.qnx.com/iat/index.html
>>
>>I don't know what the developer and run-time license costs for QNX are
>>though.
>>
>>Standard disclaimer - no connection with QNX - yadda yadda...
>>
>>Lee - AA0JP
>>
>
>Lee,
>
>I downloaded the sample and it runs quite nicely. It does indeed boot
>from a 1.44Mb floppy. However, the OS decompresses its binaries into RAM
>before execution. The system requires approximately 6MB of free RAM to
>operate.
>
>Last time we checked the QNX OS was somewhere around 1,500 for a
>development system with runtime licenses at approximately 35 - 50 bucks
>in small quantities.
>
>- darnell gadberry KE6UCL
>
>
```

---

## 51. Re: [SS:1619] Re: Ethernet Interface

From: Bill Beech <bbeech@ods.com>  
Date: Thu, 17 Jul 1997 09:08:52 -0500  
To: ss@tapr.org  
Message-ID: <33CE2774.72708FA2@ods.com>  
Rendered body type: text/plain

Lyle Johnson wrote:

```
> > Linux
> > Pros:
```

[deleted]

Lyle, I agree with you. I have been using Linux for several years, and have been impressed with the performance and reliability. And with the complete source code, if it does not do something I want, I can correct it.

Isn't there a group under linux working on a small kernel for real-time apps? I have seen references to a small kernel.

73  
Bill, NJ7P

---

## 52. Re: [SS:1621] Re: Ethernet Interface

From: "Frederick M. Spinner" <fred@tekdata.com>  
Date: Thu, 17 Jul 1997 10:06:41 -0500 (CDT)  
To: ss@tapr.org  
Message-ID: <Pine.LNX.3.95.970717094943.5831A-100000@tekdata.com>  
Rendered body type: text/plain

On Thu, 17 Jul 1997, James T. McCartney III wrote:

```
> Yup, QNX is YAEOS (yet another embedded OS) which is widely available. Others
> are PSOS, VxWorks, Lynx and a host of others. Usually, these OS's are fairly
> full featured, offer both physical or virtual memory support, TCP/IP stacks
>
> So these OS offerings are not for the faint of heart. They are as a rule
```

> very good workhorses, but don't expect them to come cheap. BTW, why does  
> everyone fawn over Linux when FreeBSD is just as viable at the same price?  
>  
Reason from someone who uses both commercially:

FreeBSD - More stable, and better suited for straight network apps.  
(No flames, Linux people, I \*love\* Linux) Some BSDI commercial programs  
run, but usually not without much fiddling.

Control over the OS development is by a central body of BSD guys, and  
hence development is slower for FreeBSD. And its next to imposible to  
get help from these guys.

One FreeBSD webserver we sold has run unattended for over a year without  
a reboot and is quite heavily loaded.

Linux - Not that much less stable, much more utilities, programming  
tools, user support, much more commercial vendor support, MUCH MUCH more  
hardware support. Has a dedicated developer and user base that far  
exceeds FreeBSDs. Kernel development is still overseen by Linus Torvalds  
but any Joe with an improvement can submit it and most likely if its good  
and works, it'll become part of the OS. This expidites the OS development  
greatly, but at the cost of some stability.

AX.25 support is better in Linux, this will make any of our amateur  
development easier. And in my experience, if you get stuck, it's far  
easier to get an answer from a Linux guy than a FreeBSD. Linux is much  
like a religion, really! And yes, I'm a believer.

Our newer Linux (we sell a streaming video product that has no vendor  
support for FreeBSD) webserver generally last 3-6 months w/o a reboot,  
the later ones haven't been rebooted at all.

I would guess that if linux wasn't so feature packed, the stability would  
be better. After all, you can expect some problems from a server that  
runs ftpd, nntpd, dns, Samba networking, Novell Server emu, Novell Client  
emu, httpd, nfsd, etc.etc.etc... There's a lot of potential for  
misconfiguration when your running 20+ servers at once!

AND without a doubt, both FreeBSD and Linux are infinitely better than  
any Microsoft CRAP. If you don't believe this check out the same hardware  
running NT4/IIS and Linux/Apache or FreeBSD/Apache. The difference is  
quite laughable. :) And the un\*xes don't crash!

Fred M. Spinner, KA9VAW  
fred@tekdata.com

---

### 53. Re: [SS:1623] Re: Ethernet Interface

From: Bernie Doehner <bad@uhf.wireless.net>  
Date: Thu, 17 Jul 1997 13:53:03 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <Pine.BSF.3.95.970717135112.1909A-100000@uhf.wdc.net>  
Rendered body type: text/plain

> AX.25 support is better in Linux, this will make any of our amateur  
> development easier. And in my experience, if you get stuck, it's far  
> easier to get an answer from a Linux guy than a FreeBSD. Linux is much  
> like a religion, really! And yes, I'm a believer.

I must be crazy for asking you this, but where do I get an ax.25 kit for  
FreeBSD 2.2.2?

Bernie

---

### 54. Re: [SS:1624] Re: Ethernet Interface

From: Bob Nielsen <nielsen@primenet.com>  
Date: Thu, 17 Jul 1997 14:48:33 -0700 (MST)  
To: Bernie Doehner <bad@uhf.wireless.net>  
Cc: ss@tapr.org  
Message-ID: <Pine.LNX.3.96.970717143634.2715A-100000@nielsen.tus.primenet.com>  
Rendered body type: text/plain

On Thu, 17 Jul 1997, Bernie Doehner wrote:

> > AX.25 support is better in Linux, this will make any of our amateur  
> > development easier. And in my experience, if you get stuck, it's far  
> > easier to get an answer from a Linux guy than a FreeBSD. Linux is much  
> > like a religion, really! And yes, I'm a believer.

>  
> I must be crazy for asking you this, but where do I get an ax.25 kit for  
> FreeBSD 2.2.2?

Believe me, it would be far easier to install Linux, but you could theoretically get the sources and hack away at things until you got it to work. A lot of it is in the Linux kernel, however, so it would be quite a task.

See the AX25-HOWTO at sunsite.unc.edu in /pub/Linux/docs/HOWTO for further information, but the kernel patches and AX.25 utilities are at ftp.pspt.fi in /pub/ham/linux/ax25. The latest stuff is kinda nice, although development is still happening.

Bob

-----  
Bob Nielsen                      Internet: nielsen@primenet.com  
Tucson, AZ                      AMPRnet: w6swe@w6swe.ampr.org  
                                 AX.25: w6swe@wb7tts.az.usa.noam  
                                 http://www.primenet.com/~nielsen

---

## 55. Re: [SS:1622] Re: Ethernet Interface

From: Lyle Johnson <lylej@azstarnet.com>  
Date: Thu, 17 Jul 1997 18:17:50 -0700  
To: ss@tapr.org  
Message-ID: <3.0.32.19970717174721.006f437c@pop.azstarnet.com>  
Rendered body type: text/plain

At 09:08 AM 7/17/97 -0500, you wrote:  
>Lyle Johnson wrote:  
>  
>> >       Linux  
>> >               Pros:  
>  
>[deleted]  
>  
>Lyle, I agree with you. I have been using Linux for several years, and  
>have been impressed with the performance and reliability. And with the  
>complete source code, if it does not do something I want, I can correct  
>it.  
>  
>Isn't there a group under linux working on a small kernel for real-time  
>apps? I have seen references to a small kernel.  
>  
>73  
>Bill, NJ7P  
>  
Yes, it is called ELKS (embedded linux kernal system, I htink).

CHeers,

Lyle

---

## 56. Harris PRISM(TM) Chip Set: World`s First To Comply With 802.11 Communications Standard

From: Dewayne Hendricks <dewayne@warpspeed.com>  
Date: Fri, 18 Jul 1997 13:47:36 -0700  
To: ss@tapr.org  
Message-ID: <v0311070faff5866bca14@[204.118.182.22]>  
Rendered body type: text/plain

SS List:

The press release below was just issued by Harris and I decided to post it to the list as I thought that it would be of general interest.

-- Dewayne

Harris PRISM(TM) Chip Set: World`s First To Comply With 802.11  
Communications Standard PRISM(TM) Was First 2.4GHz Direct Sequence Chip  
Set - Now World`s First Again <>

July 18, 1997

MELBOURNE, Fla., July 17 /PRNewswire/ via Individual Inc. -- Harris Semiconductor announced that its PRISM(TM) product, a complete radio chip set for direct sequence spread spectrum (DSSS) data communications in wireless local area networks (WLANs), fully complies to the Institute of Electrical and Electronics Engineers (IEEE) new 802.11 standard just approved June 26. The PRISM chip set includes six highly integrated microcircuits that handle "antenna-to-bits" signal processing -- from the reception of high frequency radio waves through various stages of signal conversion and processing to a digital bit stream.

"Harris was the first company to offer any such complete wireless chip set for the 2.4GHz spectrum, and is still the only company in the world to offer a product of this type that complies with the newly approved standard," said Mick Denham, vice president of signal processing products at Harris Semiconductor. "Moreover, this is only the first product coming out of a massive and ongoing R&D effort aimed at inventing innovative solutions for the fast growing wireless local area network (WLAN) market, projected to grow to over \$1 billion by 2001. Our next major announcement will be for a wireless solution with 10 megabits per second (Mbps) data rate, introduced by year-end."

Regarding the approval of the 802.11 standard, Denham said, "We're delighted the standard is now approved because it assures interoperability between end equipment, giving equipment manufacturers the confidence to invest in products for this high growth market. Because of that, a big part of our wireless data communications R&D effort was vigorous support for getting a worldwide standard drafted and approved."

According to Denham, Harris has four voting members on the committee and the company has been a major contributor in drafting and supporting this standard. "This new standard will do for wireless local area networks what similar standards did for wired Ethernet, Internet Protocol (IP) and LANs. It's extremely gratifying and exciting to have an approved standard -- it will help drive further market growth," Denham said.

At present, the 802.11 standard defines wireless LAN communications in the 2.4GHz radio spectrum at a maximum data communications rate of 2Mbps. Harris' senior 802.11 committee member Al Petrick, strategic marketing manager for wireless products, expects that -- with the initial 802.11 standard now approved -- the committee will begin defining standards of operation at higher data rates and frequencies. "I believe the committee will quickly begin the process of defining data communications at 10Mbps. Such an extension to the standard might be developed and approved as early as spring of next year." In fact, during the 802 Plenary held in Maui July 7-10, the 802.11 Working Group of 60 members approved a Project Authorization Request (PAR) for submission to the 802 Executive Committee in the fall, Petrick reports. Once approved, the committee can begin definition of operation at data rates in the 10Mbps area. The committee is expected to begin work defining operation in the 5GHz frequency band after that.

Harris has been pursuing an aggressive roadmap to higher frequency and higher data rate wireless communications, helped in large part by its early success with the initial PRISM chip set introduced to the market over a year ago. Harris was the first to have a complete radio chip set and teamed early with AMD who developed PCnet(TM)-Mobile, a wireless LAN media access controller (MAC) with associated software driver and 802.11 protocol firmware. "Our partnership with Harris has significantly lowered barriers to entry into the wireless LAN market," said Cyrus Namazi, AMD's wireless LAN product marketing manager. "The combination of AMD's PCnet-Mobile and Harris' PRISM chip set provides a shorter total time to market, a lower overall system cost, and superior performance. With the 802.11 standard now in place, we are excited to continue our full support toward the implementation of fully compliant solutions."

Harris also teamed with Celestica who manufactures the system on a PC card (formerly called PCMCIA card). "The result of that effort is a complete wireless communications adapter that plugs into a laptop, desktop PC, or handheld PC and provides data communications for wireless local area networking," Petrick explained. The adapter cards are included in Harris evaluation kits that have been in the hands of hundreds of customers for over a year, allowing quick evaluation of a working system. "Working with customers using our evaluation kits gives us a glimpse into their product roadmaps," Petrick said. "We find that they want to migrate to higher data rates in the future, plus operate in the higher, less crowded frequencies. Our roadmap was put in place to address those future needs, so we're working now on moving to 10 and

25Mbps speed in data transmission, as well as moving into the 5GHz and higher radio frequencies."

Since transmitting more data per second is a high priority, Harris invented a new modulation technique that will soon demonstrate operation at 10Mbps data rates, still operating in the unlicensed 2.4GHz frequency range. Harris is working to get FCC approval of this technique now. Harris plans to make announcements on this higher data rate WLAN chip set by the end of 1997. Parallel to that effort is developing advanced highly integrated circuits that can handle much higher frequencies. Harris has foundry access to silicon germanium (SiGe), which the company believes will allow manufacture of future chips that transmit and receive in the 5GHz, then 10GHz frequencies.

Harris also plans to develop PRISM-based chip set solutions that are cost- and feature-optimized for an emerging home consumer market. Market research indicates that homes of the future will feature many devices -- PCs, printers, phones, speakers, etc. -- connected wirelessly to a local area network within the home that is ported to outside wired services such as the Internet, cable or phone networks. That market requires low cost wireless connections and Harris has a major initiative underway to develop wireless products to meet those requirements.

Harris' overall wireless strategy is to offer complete chip set solutions with all the critical RF analog, digital and mixed-signal ICs included. This, along with complete reference design information, evaluation boards and expert applications support, provides equipment manufacturers with the shortest time- to-production for releasing new products to emerging markets. Harris is currently offering this type of complete solution for wireless LAN data transmission at 2.4GHz and wireless local loop applications in the 2.0GHz to 2.7GHz range. In the future, Harris will offer solutions for PCS as well as higher frequency, higher data rate LANs.

Harris Corporation's Semiconductor sector manufactures discrete semiconductors and ICs and focuses on the communications, multimedia and power control markets. The company has sales offices worldwide and manufacturing facilities in Palm Bay, Fla.; Mountaintop, Penn.; Findlay, Ohio; Dundalk, Ireland; and Kuala Lumpur, Malaysia.

Harris Corporation (NYSE: HRS), with worldwide sales of more than \$3.6 billion, is an international communications and electronics company providing a wide range of products and services, such as wireless and personal communications, automotive electronics, transportation, business information, defense communications and information, and Lanier office products.

PRISM is a registered trademark of Harris Corporation. PCnet-Mobile is a registered trademark of Advanced Micro Devices SOURCE Harris Corporation

/CONTACT: John S. Allen, Senior Manager, Public Relations, Harris Corporation, 407-729-4928, or fax, 407-729-5312, or e-mail, jallen02@harris.com; or Jeff Feldman, FS Communications, 415-691-1488/ (HRS)

[Copyright 1997, PR Newswire]

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## 57. Re: [SS:1626] Re: Ethernet Interface

From: "Matthew D. Porter" <porter@neta.com>  
Date: Fri, 18 Jul 1997 16:00:57 -0500 (EST)  
To: ss@tapr.org  
Message-ID: <Pine.GS0.3.95.970718134642.26750A-100000@trojan>  
Rendered body type: text/plain

On Thu, 17 Jul 1997, Lyle Johnson wrote:

> >Isn't there a group under linux working on a small kernel for real-time  
> >apps? I have seen references to a small kernel.  
> >  
> >73  
> >Bill, NJ7P  
> >  
> Yes, it is called ELKS (embeded linux kernal system, I htink).

But it is more or less targeted at 8086/8 processors for now. The whole design is done for x86 in real mode so it has some severe limitations on the kernel size. It will be a long time before there is any real networking code. It does, however, boot real nice on my old PC/XT, bring up some VT's, and can run some \_small\_ programs.

There are several people talking about ports to 68000 and other older processors.

Matt Porter KB8UVI  
Chandler, AZ

Email with "Subject: sendkey" for PGP key  
porter@neta.com

---

## 58. digest 360

From: dan <dan@lakeweb.net>  
Date: Fri, 18 Jul 1997 18:59:22 -0700  
To: ss@tapr.org  
Message-ID: <33D01F7A.66C3@lakeweb.net>  
Rendered body type: text/plain

I have finally gotten the catalog that I had ordered the Ku band lnb from.

PETRA sells it:  
LNB #PERGLNBFS single feed \$35.50  
DISH #PERSS18 18' Dish \$28.90

The phone: 1.800.443.6975

The order came into me for a little more than \$80.00 with shipping.

I also make a strong vote for Linux.  
Best, Dan. kj6fi <http://www.lakeweb.com/>

---

## 59. Re: [SS:1628] Re: Ethernet Interface

From: "James T. McCartney III" <jtmiii@uisx.skd.com>  
Date: Fri, 18 Jul 1997 22:52:40 -0400  
To: ss@tapr.org  
Message-ID: <3.0.1.32.19970718225240.0099a780@uisx.skd.com>  
Rendered body type: text/plain

Off the thread of the subject so sorry...

Why would they want to restrict it to REAL mode for goodness sake? Just because you turn on the pageing doesn't mean you aren't real time. I've built some real time systems on machines which didn't have a non-virtual mode and yes, if it ever page faulted, you lost big time - no disk! So we turned that into an advantage during the development cycle... replaced the pager with a traceback facility that told us where we had gone wrong.

BTW, the real time system I'm working on now currently has a sub-millisecond response time and an in-memory database of 64MB - couldn't do that with any lowly REAL mode X86 anything.

When the minimum increment of DRAM is practically 16MB why bother with real mode? What would be good is a flat model 32bit romable (don't need no stinkin' doz) kernel that can reach all of memory without funky memory extenders...

James

At 06:03 PM 7/18/97 -0500, you wrote:

```
...
>> Yes, it is called ELKS (embedded linux kernal system, I htink).
>
>But it is more or less targeted at 8086/8 processors for now. The whole
>design is done for x86 in real mode so it has some severe limitations on
>the kernel size. It will be a long time before there is any real
>networking code. It does, however, boot real nice on my old PC/XT, bring
>up some VT's, and can run some _small_ programs.
>
>There are several people talking about ports to 68000 and other older
>processors.
>
>Matt Porter KB8UVI
>Chandler, AZ
>
>
```

Email with "Subject: sendkey" for PGP key  
porter@neta.com

---

## 60. Re: [SS:1630] Re: Ethernet Interface

From: "Matthew D. Porter" <porter@neta.com>  
Date: Sun, 20 Jul 1997 15:53:35 -0500 (EST)  
To: ss@tapr.org

Message-ID: <Pine.GSO.3.95.970720154902.15280A-100000@trojan>  
Rendered body type: text/plain

On Fri, 18 Jul 1997, James T. McCartney III wrote:

> Why would they want to restrict it to REAL mode for goodness sake? Just  
> because you turn on the paging doesn't mean you aren't real time. I've  
> built some real time systems on machines which didn't have a non-virtual  
> mode and yes, if it ever page faulted, you lost big time - no disk! So we  
> turned that into an advantage during the development cycle... replaced the  
> pager with a traceback facility that told us where we had gone wrong.  
>  
> BTW, the real time system I'm working on now currently has a sub-millisecond  
> response time and an in-memory database of 64MB - couldn't do that with any  
> lowly REAL mode X86 anything.  
>  
> When the minimum increment of DRAM is practically 16MB why bother with real  
> mode? What would be good is a flat model 32bit romable (don't need no stinkin'  
> doz) kernel that can reach all of memory without funky memory extenders...  
>

That's just the machine base they are targetting. The developers  
are trying to do something with all those old "useless" machines that are  
given away free. Then name is misleading IMHO, since most of us are using  
it to run on desktop XT machines.

There is an RTLinux (Real Time Linux) page somewhere there for anybody  
interested in a real protected mode real-time Linux, though.

Matt Porter KB8UVI  
Chandler, AZ

Email with "Subject: sendkey" for PGP key  
porter@neta.com

---

## 61. Removal from list

From: Leo E Hodapp <lehoda01@starbase.spd.louisville.edu>  
Date: Mon, 21 Jul 1997 20:22:51 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <199707220022.UAA28062@starbase.spd.louisville.edu>  
Rendered body type: text/plain

Could I please be removed from this list.  
Thanks,  
Lee

---

## 62. Re: [SS:1632] Removal from list

From: topcats@hotmail.com (topcat)  
Date: Tue, 22 Jul 1997 12:43:35 GMT  
To: ss@tapr.org  
Message-ID: <33d6aad9.86726926@mail.tds.net>  
Rendered body type: text/plain

On Mon, 21 Jul 1997 19:23:47 -0500 (CDT), you sopke loudly:

>Could I please be removed from this list.  
>Thanks,  
>Lee  
>

fuck no!!!

---

## 63. Re: [SS:1632] Removal from list

From: Monte.Tremont@nextel.com (Monte Tremont)  
Date: Tue, 22 Jul 1997 08:59:06 -0400  
To: ss@tapr.org, Leo E Hodapp <lehoda01@starbase.spd.louisville.edu>  
Message-ID: <0002AED1.@nextel.com>  
Rendered body type: text/plain

I am also trying to get disconnected from all @tapr.org that  
constantly clog my Email. Also lately I now receive a copy of (as BCC)  
every one else that tries to leave this newsgroup. HELP TAPR !!!

---

Subject: [SS:1632] Removal from list  
Author: Leo E Hodapp <lehoda01@starbase.spd.louisville.edu> at INTERNET  
Date: 7/21/97 7:23 PM

Could I please be removed from this list.  
Thanks,

**64. Re: [SS:1634] Re: Removal from list**

From: Bob Nielsen <nielsen@primenet.com>  
 Date: Tue, 22 Jul 1997 08:53:27 -0700 (MST)  
 To: Monte Tremont <Monte.Tremont@nextel.com>, lehoda01@starbase.spd.louisville.edu@primenet.com  
 Cc: ss@tapr.org  
 Message-ID: <Pine.LNX.3.96.970722085046.1687A-100000@nielsen.tus.primenet.com>  
 Rendered body type: text/plain

On Tue, 22 Jul 1997, Monte Tremont wrote:

> I am also trying to get disconnected from all @tapr.org that  
 > constantly clog my Email. Also lately I now receive a copy of (as BCC)  
 > every one else that tries to leave this newsgroup. HELP TAPR !!!

>

> \_\_\_\_\_ Reply Separator \_\_\_\_\_

> Subject: [SS:1632] Removal from list  
 > Author: Leo E Hodapp <lehoda01@starbase.spd.louisville.edu> at INTERNET  
 > Date: 7/21/97 7:23 PM

>

>

> Could I please be removed from this list.

> Thanks,

> Lee

>From the directions:

Send a message to 'listproc@tapr.org' with one of the following lines as  
 the message portion:

unsubscribe <list>

signoff <list>

Bob

----

|             |                                                                                 |
|-------------|---------------------------------------------------------------------------------|
| Bob Nielsen | Internet: nielsen@primenet.com                                                  |
| Tucson, AZ  | AMPRnet: w6swe@w6swe.ampr.org                                                   |
|             | AX.25: w6swe@wb7tts.az.usa.noam                                                 |
|             | <a href="http://www.primenet.com/~nielsen">http://www.primenet.com/~nielsen</a> |

**65. Re: [SS:1632] SS digest 364**

From: sotoole@zinet.com (Steve O'Toole)  
 Date: Wed, 23 Jul 1997 15:53:09 +0000  
 To: ss@tapr.org  
 Message-ID: <B0000029896@zinet.com>  
 Rendered body type: text/plain

> SS Digest 364

>

>Topics covered in this issue include:

>

> 1) Removal from list

> by Leo E Hodapp <lehoda01@starbase.spd.louisville.edu>

>

>-----

>

>Date: Mon, 21 Jul 1997 20:22:51 -0400 (EDT)

>From: Leo E Hodapp <lehoda01@starbase.spd.louisville.edu>

>To: ss@tapr.org

>Subject: Removal from list

>Message-ID: <199707220022.UAA28062@starbase.spd.louisville.edu>

>

>Could I please be removed from this list.

>Thanks,

>Lee

>

>

>-----

>

>End of SS Digest 364

>\*\*\*\*\*

>Alright-allready



## 66. Re: [SS:1632] SS digest 364

From: sotoole@zinet.com (Steve O'Toole)  
Date: Wed, 23 Jul 1997 16:01:40 +0000  
To: ss@tapr.org  
Message-ID: <B0000029897@zinet.com>  
Rendered body type: text/plain

```
>
>                                     SS Digest 364
>
>Topics covered in this issue include:
>
> 1) Removal from list
>     by Leo E Hodapp <lehoda01@starbase.spd.louisville.edu>
>
>-----
>
>Date: Mon, 21 Jul 1997 20:22:51 -0400 (EDT)
>From: Leo E Hodapp <lehoda01@starbase.spd.louisville.edu>
>To: ss@tapr.org
>Subject: Removal from list
>Message-ID: <199707220022.UAA28062@starbase.spd.louisville.edu>
>
>Could I please be removed from this list.
>Thanks,
>Lee
>
>
>-----
>
>End of SS Digest 364
>*****
>I said alright already enough with the requests...
```

---

## 67. Spread Spectrum articles in CQ VHF

From: Dewayne Hendricks <dewayne@warpspeed.com>  
Date: Tue, 22 Jul 1997 16:24:04 -0700  
To: ss@tapr.org  
Message-ID: <v0311071faffaee926a6@[204.118.182.22]>  
Rendered body type: text/plain

I'd like to call everyone's attention to the August '97 issue of 'CQ VHF'. There are two excellant articles there on SS. They are:

1. "Spread Spectrum - Yesterday and Today" by Steve Bible, N7HPR p.32
2. "The Debate over Spread Spectrum" by Rich Moseson, W2VU p.26

The first article by Steve goes over a bit of SS history including the famous Costas paper and then covers some of SS's current uses in the commercial sector. The second article by Rich (who is also the editor of 'CQ VHF') is a very good overview of all of the comments/reply comments that were filed on the recent SS NPRM (FCC Docket 97-12). For those of you who fell asleep reading thru all of that paper (or words on the TAPR website), its a good way to find out what everyone said on the issue.

-- Dewayne

--

```
~~~~~
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>
Fax: (510) 770-9854 !
~~~~~
```

## 68. Re: Is SS The Solution For High Speed Packet Networks?

From: Phil Karn <karn@qualcomm.com>  
Date: Tue, 22 Jul 1997 21:52:11 -0700 (PDT)  
To: wb9mjm%wb9mjm.ampr.org@uugate.aim.utah.edu  
Cc: ss@tapr.org  
Message-ID: <199707230452.VAA19520@servo.qualcomm.com>  
Rendered body type: text/plain

```
>> This is a rather wasteful use of spectrum.

> How so? DDMA-WAN is narrower in BW than a CDMA system at the same
>baud rate. Since it uses antenna off-boresite rejection to allow for a
>lesser processing gain. And lesser processing gain results in a narrower
```

Gain antennas are certainly helpful, but you're still using a signal with greater spectral density than you need. That means within the beamwidth of your antenna you're causing more interference to distant co-channel users than you really have to.

> The FCC considers that for every 3 dB increase in antenna gain, only a  
>1 dB decrease in power level is needed to maintain the same illumination  
>contours. If, one drops the power to only what one needs to do the  
>communication, for every 3 dB gain in transmitter antenna gain, one can  
>decrease illuminated area by 2 dB. And this does not even consider the  
>second 3 dB power reduction possible if the receive antenna gain tracks  
>the transmitter, in the system design.

I suspect this rule accounts for the usual greater-than-inverse-square propagation loss on most terrestrial paths. Empirically the loss is generally about inverse-fourth once you're outside the immediate line-of-sight area. Again, I don't want to discount the usefulness of directional antennas, but they don't completely compensate for using a more wasteful modulation/coding method.

> Yes, this is true. Which is why I used the SAW device only as a  
>model. To prove that the Matched Filter Technique could decode in one  
>symbol time.

Again, any device is ultimately limited by the mathematics that describe the process it performs.

> So, I see this is similar to the SAW matched filter technique. Some  
>time during the period, the convolution reaches a correlation peak power  
>level, which is coincident with the time alignment of the received  
>signal, and the local PN sequence. If the symbol clock is aligned with  
>this time, it's aligned with the received data symbol. Does this make  
>sense?

Right. Any PN correlator, no matter how it is implemented, will behave the same way. And it is important to remember that no matter how you implement the correlator, you *must* dwell on each particular time alignment long enough to integrate sufficient energy to actually recognize that you've got the right timing. That's fundamental.

Here are the only ways I know of to speed up an SS acquisition:

1. Use excessive transmitter power or oversized antennas to make the SNR so high that you don't have to wait very long on each time offset to accumulate a significant amount of despread energy.
2. Use a short PN code so you don't have as many hypotheses to search. (GPS uses a short 1023-chip C/A code for acquisition.)
3. Use multiple correlators to test many hypotheses in parallel. (Multi-channel GPS receivers do this.)
4. Use a-priori information to first search those parts of the sequence space that are more likely to be correct. (GPS receivers do this when warm-starting).

Phil

---

## 69. Re: [SS:1630] Re: Ethernet Interface

From: "James T. McCartney III" <jtmiii@uisx.skid.com>  
Date: Wed, 23 Jul 1997 02:19:36 -0400  
To: ss@tapr.org  
Message-ID: <3.0.1.32.19970723021936.009219c0@uisx.skid.com>  
Rendered body type: text/plain

At 11:16 AM 7/19/97 -0700, you wrote:

>Also, it looks as if they want to run on '88/'86 and '186 type h/w. You may  
>not be aware that the '186 is quickly becoming \_the\_ embedded processor of  
>choice.

What class of problem? Haven't seen very many high speed data applications built on 186 class machine. Maybe if you are doing something that controls a few relays, monitors a few a/d, talk rs232 or 485 I/O this it would do.

Some of the apps I've been working on recently we are seriously concerned that a 233 MHz MPC860 won't do the data movement job. That doesn't even begin to address the DSP problem.

>The usual reason that people don't use vm is a context swap penalty.

What processor? On something like an ultraSparc maybe, but then again that is a machine with no physical mode anyway. Something like an Alpha the context swap is almost automatic, but can sometimes be delayed (at least for floating point context) so that if you get lucky you don't have to. For PowerPC, I'd have to go digging in the databook. For the CPU-32, push multiple, swap to super stack, done.

Still, taking the cache miss because an interrupt went off may be as big a hit as the context swap. The interrupt definately flushes the pipeline, so you are already deep into it by the time the context swap happens.

Also, if the machine does speculative write buffer combining, talking to an I/O device means you have to barrier the writes to ensure write ordering - stalled again. Otherwise setting the bit from one to zero, then back to one results in no transaction on the bus as the write buffer gobbles it all up. Been there, it sucks - lines don't draw in the place you expect them to...

And then you can get into SMP configurations where processor one finishes the I/O started by processor two and exits the kernel before processor two has worked it's way back out of the driver... caught a bug in TTDRIVER on VMS like this once.

Then again there's this Mobitex application I worked on that a lowly 6811 was overkill. Like you said what are the unstated assumptions? Some that I don't make are

embedded == slow, embedded == cheap, embedded == small or embedded == large

it all depends, and that's what makes engineering fun...

James

---

## 70. Re: Is SS The Solution For High Speed Packet Networks?

From: Don Lemke <wb9mjn@wb9mjn.ampr.org>  
Date: Wed, 23 Jul 1997 09:19:18 -0500  
To: Phil Karn <karn@qualcomm.com>  
Cc: ss@tapr.org  
Message-ID: <33D612E6.33AD@wb9mjn.ampr.org>  
Rendered body type: text/plain

Hi Phil,

Power control works for CDMA, why wont it work with a gain antenna attached?

> Gain antennas are certainly helpful, but you're still using a signal  
> with greater spectral density than you need. That means within the  
> beamwidth of your antenna you're causing more interference to distant  
> co-channel users than you really have to.

With power control, with just enuf margin to get the signal to the next neighbor in the direction of the destination, the signal reaches only as far as it needs too.

> I suspect this rule accounts for the usual  
greater-than-inverse-square  
> propagation loss on most terrestrial paths. Empirically the loss is  
> generally about inverse-fourth once you're outside the immediate  
> line-of-sight area. Again, I don't want to discount the usefulness of  
> directional antennas, but they don't completely compensate for using  
> a more wasteful modulation/coding method.

The -1dBp/+3dBG rule is used for Point-to-Point terrestrial microwave. Point-to-Point terrestrial microwave does not have an inverse-fourth propagation characteristic. I believe the Inverse-fourth propagation characteristic is the model commonly used for Base to omni mobile/handheld.

The DDMA-WAN is a short haul Point-to-Point system. Rooftop-to-Rooftop, with only the First Fresnel, or slightly beyond paths being used. First Fresnel paths have 6 dB less loss than freespace. As the path approaches grazing, the Fresnel loss kicks in

pretty aggressively. The loss at grazing is typically 20 dB more than free space. That's a 26 dB additional loss. Can you see how at low antenna heights, in the microwaves, with very directional antennas, will make this work? It's not CDMA, it's not Cellular. It's versatilized Point-to-Point. Using enough power to bridge the 6 dB less than free space path to the neighbor, it doesn't take much more distance to get that 26 dB more loss of the grazing path. In combination with directivity, and the 10 dB processing gain, (23 dB total system isolation gain) there is the possibility of reuse.

The point is that process gain is not the solely available from Spread Spectrum. There are other ways to get isolation in a system design, for the purposes of reuse. Antenna directivity (off-boresite rejection), and DSSS Process gain can combine, to give the same results as a long DSSS code alone. Just because Antenna Directivity has been around some time, does not mean that it's less useful. Just because DSSS process gain is useful, does not mean all system isolation gain should be DSSS derived.

In a packet radio network, the goal is maximum throughput for the individual user for the bandwidth/area/time at some minimum BER. In a CDMA Cellular Phone system, the goal is the maximum number of toll quality channels, for the hardware investment. A toll quality channel is somewhere around 10 KB, with better than  $10^{-2}$  BER. This is a big difference than the packet radio network goal of getting maximum throughput, with the desire being a megabaud throughput to the immediate neighbors, and a worse case in excess of 100 kb throughput into the Internet.

It's impractical for cellular telephone handheld devices to employ azimuthally directive antennas, at the frequencies that are economic right now. So, it's no wonder that CDMA IS-95 has all its system rejecting gain in CDMA process gain, and for the baud rate to be consequently low.

In a Ham Radio packet network, we are mostly stationary users. We have space for antennas on roof tops, or other elevated location. We can make a system that has a 20 dB faster/bigger data rate/bandwidth. But, it's not practical to make a system like that have all its system rejection gain from DSSS process gain. It is possible to have 10 dB in DSSS process gain. It is possible to get another 13 dB in the antenna directivity.

DDMA-WAN should be able to do the the Packet Radio goal. And not just between two stations. But when a network of stations, spread out the way hams typically are, is using the spectrum.

--

73, Don.

AMPRNet : wb9mjm@wb9mjm.ampr.org[44.72.98.19]  
Internet: wb9mjm@wb9mjm.ampr.org@uugate.aim.utah.edu  
Website: <http://www.qth.com/antpanel>

## 71. Re: Is SS The Solution For High Speed Packet Networks?

From: Phil Karn <karn@qualcomm.com>  
Date: Wed, 23 Jul 1997 17:14:24 -0700 (PDT)  
To: wb9mjm@wb9mjm.ampr.org@uugate.aim.utah.edu  
Cc: ss@tapr.org  
Message-ID: <199707240014.RAA29439@servo.qualcomm.com>  
Rendered body type: text/plain

> Power control works for CDMA, why won't it work with a gain antenna  
> attached?

I didn't say it wouldn't work.

> With power control, with just enough margin to get the signal to the  
> next neighbor in the direction of the destination, the signal reaches  
> only  
> as far as it needs too.

RF always goes farther than you want it to. Even if you use power control to keep the received signal level at some threshold, choosing an inefficient modulation or coding scheme will cause that power to be higher than it otherwise would be. And that causes more interference to co-channel users even if they're not close enough to actually

demodulate your signal.

> The -1dBp/+3dBG rule is used for Point-to-Point terrestrial  
>microwave. Point-to-Point terrestrial microwave does not have an  
>inverse-fourth propagation characteristic. I believe the Inverse-fourth  
>propagation characteristic is the model commonly used for Base to omni  
>mobile/handheld.

The desired point-to-point link is certainly inverse-square if it is  
line of sight. But the power rules are there to protect others who are  
\*not\* within line of sight to the transmitter.

> The point is that process gain is not the solely available from  
>Spread Spectrum. There are other ways to get isolation in a system  
>design, for the purposes of reuse. Antenna directivity (off-boresite

I agree with you on this. My only point is that even with directional  
antennas, you are still paying a price in capacity by using a less  
efficient modulation and coding method. But you may well be right that  
the price is acceptable, at least in the amateur environment.

> In a packet radio network, the goal is maximum throughput for the  
>individual user for the bandwidth/area/time at some minimum BER. In a  
>CDMA Cellular Phone system, the goal is the maximum number of toll  
>quality channels, for the hardware investment. A toll quality channel  
>is somewhere around 10 KB, with better than 10e-2 BER. This is a big  
>difference than the packet radio network goal of getting maximum  
>throughput, with the desire being a megabaud throughput to the immediate  
>neighbors, and a worse case in excess of 100 kb throughput into the  
>Internet.

We've analyzed packet radio applications as compared to digital voice,  
and they're really not any different in the sense that you describe.  
Where these applications \*do\* differ is in their tolerance of delay.  
Packet networking, particularly at high speed, is far more tolerant of  
delay than low speed voice, and this allows a very important  
architectural feature that is unavailable in cellular voice:  
cooperative relaying. It has been clearly shown that the way to  
maximize the capacity of a power-controlled store-and-forward packet  
radio network is to have each node communicate directly only with its  
nearest neighbors and to have those neighbors relay traffic for you.  
See Tim Shepard's PhD thesis (link from my web page).

> Its impractical for cellular telephone handheld devices to  
>employ azimuthally directive antennas, at the frequencies that are  
>economic right now. So, its no wonder that CDMA IS-95 has all its system  
>rejecting gain in CDMA process gain, and for the baud rate to be  
>consequently low.

Gain antennas on the cellular \*base stations\* are quite practical, and  
are in fact used very heavily. They contribute substantially to system  
capacity, yet there is no talk of lessening the CDMA process  
gain. They're both important.

Phil

---

## 72. Re: [SS:1641] Re: Is SS The Solution For High Speed Packet Networks?

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>  
Date: Thu, 24 Jul 1997 04:12:31 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <199707240412.EAA10295@lynx.ve3jf.ampr.org>  
Rendered body type: text/plain

Don Lemke <wb9mjn@wb9mjn.ampr.org> wrote:

> The DDMA-WAN is a short haul Point-to-Point system.  
> Rooftop-to-Rooftop, with only the First Fresnel, or slightly beyond  
> paths being used. First Fresnel paths have 6 dB less loss than  
> freespace. As the path approaches grazing, the Fresnel loss kicks in  
> pretty aggressively. The loss at grazing is typically 20 dB more than free  
> space. That's a 26 dB additional loss. Can you see how at low antenna  
> heights, in the microwaves, with very directional antennas, will make  
> this work? Its not CDMA, Its not Cellular. Its versatilized  
> Point-to-Point. Using enough power to bridge the 6 dB less than free space  
> path to the neighbor, it doesn't take much more distance to get that 26  
> dB more loss of the grazing path. In combination with directivity, and  
> the 10 dB processing gain, (23 dB total system isolation gain) there is  
> the possibility of reuse.

It's a side issue to your main point, but I'm wondering where you get these

numbers, especially the one about paths with first Fresnel clearance having 6 dB less loss than free space. It's true that you can have slightly less loss than free space with partial Fresnel clearance, but at most the gain is about 1.2 dB. This occurs within a fairly narrow range of clearances, so it's not something you should count on - you can just as easily have a path loss which is slightly worse than free space. The path loss oscillates above and below the free space value as the Fresnel clearance increases, but it rapidly converges on the free space value. The path loss at grazing incidence depends very much on the nature of the obstruction - if it is rounded (e.g., a hill), then the excess path loss could indeed be 20 dB or so, but if it is something closer to a knife edge, then the excess loss could be as little as 6 dB. The reuse distance may consequently be greater than you expect.

Barry

--

|                             |                                                                             |
|-----------------------------|-----------------------------------------------------------------------------|
| Barry McLarnon VE3JF/VA3TCP | Internet: <a href="mailto:bm@hydra.carleton.ca">bm@hydra.carleton.ca</a>    |
| Ottawa Amateur Radio Club   | AMPRnet: <a href="mailto:bm@lynx.ve3jf.ampr.org">bm@lynx.ve3jf.ampr.org</a> |
| Packet Working Group        | Web: <a href="http://hydra.carleton.ca">http://hydra.carleton.ca</a>        |

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### 73. Re: Is SS The Solution For High Speed Packet Networks?

From: Don Lemke <[wb9mjn@wb9mjn.ampr.org](mailto:wb9mjn@wb9mjn.ampr.org)>  
Date: Thu, 24 Jul 1997 10:00:04 -0500  
To: Phil Karn <[karn@qualcomm.com](mailto:karn@qualcomm.com)>  
Cc: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <[33D76DF4.2E60@wb9mjn.ampr.org](mailto:33D76DF4.2E60@wb9mjn.ampr.org)>  
Rendered body type: text/plain

Hi Phil,

Regarding:

> > The point is that process gain is not the solely available from  
> > Spread Spectrum. There are other ways to get isolation in a system  
> > design, for the purposes of reuse. Antenna directivity (off-boresite  
>  
> I agree with you on this. My only point is that even with directional  
> antennas, you are still paying a price in capacity by using a less  
> efficient modulation and coding method. But you may well be right that  
> the price is acceptable, at least in the amateur environment.

The baseband modulation in the STEL2000A is BPSK, or QPSK. And it does straight forward BPSK or QPSK DSSS spreading. QPSK is probably more efficient modulation than .5GFSK (K9NG/G3RUH, etc). I don't see how the DSSS is any more or less efficient coding than any other DSSS, if in the system the process gain is not overcome. But, hey, I'm not a coding expert.

> We've analyzed packet radio applications as compared to digital voice,  
> and they're really not any different in the sense that you describe.  
> Where these applications \*do\* differ is in their tolerance of delay.  
> Packet networking, particularly at high speed, is far more tolerant of  
> delay than low speed voice, and this allows a very important  
> architectural feature that is unavailable in cellular voice:  
> cooperative relaying. It has been clearly shown that the way to  
> maximize the capacity of a power-controlled store-and-forward packet  
> radio network is to have each node communicate directly only with its  
> nearest neighbors and to have those neighbors relay traffic for you.  
> See Tim Shepard's PhD thesis (link from my web page).  
>

I agree that any DSSS (using full or partial CDMA) packet radio network should direct relayed traffic to the nearest neighbor, using power control. I've been saying that for a year, if not 2 years, as a primary feature/requirement of a DDMA-WAN architecture. It grows out of the discussion regarding omni-cdma packet networks that was on one of the news groups, some years ago. Where it was concluded that to get maximum reuse and capacity, one should link only to the nearest neighbors.

There is a slight difference with DDMA-WAN, however. Its the nearest neighbor down each beam direction, that can be communicated with, without interfering with the other neighbors. This would be an easy calculation that could be done by the controller, based on the negotiated power levels between two neighbors, and the table of powers previously generated with the other neighbors.

> > Its impractical for cellular telephone handheld devices to  
 > > employ azimuthally directive antennas, at the frequencies that are  
 > > economic right now. So, its no wonder that CDMA IS-95 has all its system  
 > > rejecting gain in CDMA process gain, and for the baud rate to be  
 > > consequently low.  
 >  
 > Gain antennas on the cellular \*base stations\* are quite practical, and  
 > are in fact used very heavily. They contribute substantially to system  
 > capacity, yet there is no talk of lessening the CDMA process  
 > gain. They're both important.

Well, I think its pretty hard for anybody to not realise that Cellular Base stations use azimuthally directive antennas, Phil. I did qualify my statement with the "cellular telephone handheld devices".

In a Ham Packet radio system, since the participants are stationary, there s no reason the participants cannot all use azimuthally directive antennas. And square the directional antenna system benefits. This is a difference resulting in an advantage we could and should exploit.

Within each CDMA Cellular Telephone sector, however, users are on various CDMA codes. The azimuth of the CDMA C.T. sector encompasses many users. DDMA-WAN design and operational goals is to have only one active neighbor being listened to by a station in the selected sector, at a time. And for each in-range active transmitter to be on a different DSSS code using only enuf power to be received by the intended communication partner. In DDMA-WAN both the directivity, and the DSSS code differentiates the various active transmitters in-range of a particular station.

Even tho CDMA C.T. uses azimuthal sectors, it still has all its user-user differentiation in DSSS code. That s the meaning of CDMA, right? This is the way it has to be , because "cellular telephone handheld devices" do not have azimuthally directive antennas!

The CDMA C.T. design goal is to have lots of users in range, versus the "nearest neighbor" of the Packet Radio network. And the CDMA C.T. design goal is to gather and diseminate to all the in-range users, simultaneously, versus TDMA/relay dissemination of a Packet Radio network. And the CDMA C.T. design goal is to have as few, company- owned sites as possible, versus the participant/user supported facilities of the Ham Packet Radio network.

Can you see how CDMA C.T. is better the way its designed, for its purpose, and how DDMA-WAN is better for the Ham Packet Radio? Can you see that there is no opportunity to do DDMA-WAN in Cellular Telephone or even in Cellular Data? DDMA-WAN is not Cellular, or micro-Cellular. Its versatile Point-to-Point. Each station is pretty much the same function as all the others. There is no BIG site. There is no BIG local service group capital investment.

DDMA-WAN is a good way to go, if it can be done. The question mark is how quick each station will lock-up. Even if its 5 symbol times, no problem. The chip vendor says 1 symbol time. As long as the lockup time is 10 times less than the smallest packets (100 bits, 50 symbols with QPSK), the overhead of the lockup time is acceptable. All this system architecture is based on that lock-up time. And its going to take direct experience with the hardware to verify this. This is Ham Radio, and this is where we should take these questionable, untried positions. This IS why the goverment gave us some spectrum to play with. If we can lock up a communicating pair of stations, across real world paths, in 1 to 5 symbols, THEN we should build our Ham Packet networks along the DDMA-WAN architecture. The DDMA-WAN architecture has many advantages for the Ham Radio enviornment. But, DDMA-WAN is not an efficient architecture if the lock-up time is slow.

--

73, Don.

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 Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu  
 Website: <http://www.qth.com/antpanel>

## 74. Re: Is SS The Solution For High Speed Packet Networks?

From: Don Lemke <wb9mjn@wb9mjn.ampr.org>  
Date: Thu, 24 Jul 1997 11:23:36 -0500  
To: bm@hydra.carleton.ca  
Cc: ss@tapr.org  
Message-ID: <33D78188.3BB7@wb9mjn.ampr.org>  
Rendered body type: text/plain

Hi Barry,

In Reference Data for Radio Engineers, they have a reprint of a Fresnel Loss curves from "Radio Propagation Fundamentals" by K. Bullington, Bell Systems Technical Journal, vol 36, no 3, Fig 8, 1957.

Working thru various paths thru the years, I've come upon the 20 dB grazing additional loss (in addition to free space loss) value for short paths as a convenient average value for system evaluation. Check out the table 1, in "Cellular Coverage Transport Networks", 7th ARRL Networking Conference, 1988, page 130. The 1250 Fresnel loss values for 20 and 15 miles are 19.7 and 22.0 dB.

The diagram in the Reference Data for Radio Engineers shows the + 6 dB gain over free space at the  $1.0 H/H_{\text{firstfresnel}} (H_0)$  point of the horizontal axis.

The diagram also shows Knife Edge Diffraction. Yes, a grazing clearance Knife Edge path has only 6 dB of loss with respect to free space path. A Knife Edge First Fresnel clearance path has a 0 dB loss with respect to free space. For a 6 dB difference. But, how common is this? What we are talking about is 2 mountain peaks in a row. The first station is even in height, with the first mountain peak. Its trying to talk to somebody on the second mountain peak, and isolate a station out at the same altitude beyond the second mountain peak. What is more common, is that u talk to somebody on the first mountain peak, and the next further stations are down the back slope of the peak. In which case, they are shadowed. Take a look at the curve. With a negative a few fresnels  $H/H_0$  value, say -2 fresnel clearance, on the Knife Edge curve is -22 dB from Free Space.

The higher one goes in frequency, the smaller this  $H_0$  value becomes for a given path. On 10 Ghz, its not uncommon to see 30 foot  $H_0$  values so, if a the station to be isolated is 60 foot lower than the second peak, he s isolated. On 2.5 Ghz, that would be 300 feet to be isolated.

Even if u had a place, where people lived on some bizare rippled terrain, the stations could downtilt the panels in the direction perpendicular to the rippled geology. And it is a time domain system. If the path is not there, because its being used, the stations can wait, or send the traffic off another direction.

--

73, Don.

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Internet: wb9mjn@wb9mjn.ampr.org@uugate.aim.utah.edu  
Website: <http://www.qth.com/antpanel>

---

## 75. Re: Is SS The Solution For High Speed Packet Networks?

From: Don Lemke <wb9mjn@wb9mjn.ampr.org>  
Date: Thu, 24 Jul 1997 11:48:28 -0500  
To: bm@hydra.carleton.ca  
Cc: ss@tapr.org  
Message-ID: <33D7875C.466A@wb9mjn.ampr.org>  
Rendered body type: text/plain

Hi Barry,

As frequency increases and the path gets shorter, its neccassary for the knife edge to be sharper and sharper. Altho, one could see a problem in a of town with high peaked roofs, and copper foil coated shingles. But the DDMA-WAN idea minimun distance (500 yard to 5 mile) paths, minimun power, maximun directivty, across flat residential areas, and to avoid shooting the RF out over low ground, or bouncing it off mountains.

I think a bigger problem is reflections. Like off water towers and



sky scrapers. As frequency moves higher, even street lights are quite effective periscope reflectors. This is why its a good idea to have DSSS , as well as directivity. And to locate the antennas up on rooftops, at the same level of the street lights. They have these especially big (1 meter by .75 meter) street light enclosures in one town here, which create havok on 1.2 Ghz, when one tries to talk to the repeater in the City from a mobile.

--

73, Don.

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Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu  
Website: <http://www.qth.com/antpanel>

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## 76. Re: [SS:1645] Re: Is SS The Solution For High Speed Packet Networks?

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>  
Date: Tue, 29 Jul 1997 03:14:51 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <199707290314.DAA16124@lynx.ve3jf.ampr.org>  
Rendered body type: text/plain

Been out of town for the past four days, and playing catch-up on email...

Don Lemke <wb9mjn@wb9mjn.ampr.org> wrote:

> Hi Barry,  
>  
> In Reference Data for Radio Engineers, they have a reprint of a  
> Fresnel Loss curves from "Radio Propagation Fundamentals" by K.  
> Bullington, Bell Systems Technical Journal, vol 36, no 3, Fig 8, 1957.  
>  
> Working thru various paths thru the years, I ve come upon the 20  
> dB grazing additional loss (in addition to free space loss) value for  
> short paths as a convient average value for system evaluation. Check out  
> the table 1, in "Cellular Coverage Transport Networks", 7 th ARRL  
> Networking Conference, 1988, page 130. The 1250 Fresnel loss values for  
> 20 and 15 miles are 19.7 and 22.0 dB.  
>  
> The diagram in the Reference Data for Radio Engineers shows the  
> + 6 dB gain over free space at the 1.0 H/Hfirstfresnel (H0) point of the  
> horizontal axis.

Okay, but that plot is for a "flat earth" or "smooth sphere" scenario where you have a reflection with reflection coefficient of -1. Thus, depending on the phase relationship between the direct and reflected path, you can have anything from 6 dB enhancement wrt free space to complete cancellation of the signal. I don't think that the 6 dB enhancement condition is something you would want to depend on - it's not very likely that you'll be that lucky, unless you're shooting over a smooth treeless hill and get the clearance just right.

I don't disagree with your contention that a number of the order of 20 dB excess path loss is a reasonable thing to work with for grazing paths in the real world - it's just that 6 dB gain for first fresnel clearance that I have a problem with.

Barry

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|                             |                                                                             |
|-----------------------------|-----------------------------------------------------------------------------|
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| Ottawa Amateur Radio Club   | AMPRnet: <a href="mailto:bm@lynx.ve3jf.ampr.org">bm@lynx.ve3jf.ampr.org</a> |
| Packet Working Group        | Web: <a href="http://hydra.carleton.ca">http://hydra.carleton.ca</a>        |

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## 77. Re: Is SS The Solution For High Speed Packet Networks?

From: Phil Karn <karn@qualcomm.com>  
Date: Wed, 30 Jul 1997 18:24:56 -0700 (PDT)  
To: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu  
Cc: ss@tapr.org  
Message-ID: <199707310124.SAA07847@servo.qualcomm.com>  
Rendered body type: text/plain

>The baseband modulation in the STEL2000A is BPSK, or QPSK. And it does  
>straight forward BPSK or QPSK DSSS spreading. QPSK is probably more  
>efficient modulation than .5GFSK (K9NG/G3RUH, etc). I don t see how the  
>DSSS is any more or less efficient coding than any other DSSS, if in the

>system the process gain is not overcome. But, hey, I'm not a coding expert.

In a SS system, the figure of merit is the required  $E_b/N_0$ . It doesn't matter what modulation and coding you use, except as they (and their implementation) affect this number.  $E_b/N_0$  is the bottom line.

> There is a slight difference with DDMA-WAN, however. It's the nearest neighbor down each beam direction, that can be communicated with, without interfering with the other neighbors. This would be an

As long as the beams are pointed in directions that allow reasonably direct paths to be followed, yes.

> In a Ham Packet radio system, since the participants are stationary, there's no reason the participants cannot all use azimuthally directive antennas. And square the directional antenna system benefits. This is a difference resulting in an advantage we could and should exploit.

Yes, except for the increased difficulty in talking to your nearest neighbors, who are probably not all in the same direction from you. Multiple directional antennas, or a single rapidly steerable antenna (e.g., a phased array) are probably necessary.

>users. DDMA-WAN design and operational goals is to have only one active neighbor being listened to by a station in the selected sector, at a time. And for each in-range active transmitter to be on a different DSSS

There's an implicit opportunity cost here, and I think you realize this. You've spread your signal by a factor (I think you said 13dB) but you aren't doing all you can to make up for this by maximum geographical reuse of the spectrum.

> Even though CDMA C.T. uses azimuthal sectors, it still has all its user-user differentiation in DSSS code. That's the meaning of CDMA,

Code \*plus\* antenna denote the user. If you walk around the cell, you'll get handed off from antenna to antenna almost as if you went from one cell to another.

I think I understand what you're doing. I just don't know if, when you rigorously work out all the numbers, you end up buying as much as you think. I know we certainly got beat up quite a bit in the early days of CDMA on this point. Still do, to a certain extent.

Phil

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## 78. Re: [SS:1648] Re: Is SS The Solution For High Speed Packet Networks?

From: "James T. McCartney III" <jtmiii@uix.skid.com>  
Date: Thu, 31 Jul 1997 09:48:33 -0400  
To: ss@tapr.org  
Message-ID: <3.0.1.32.19970731094833.0099a100@uix.skid.com>  
Rendered body type: text/plain  
... much deleted ...

>> In a Ham Packet radio system, since the participants are stationary, there's no reason the participants cannot all use azimuthally directive antennas. And square the directional antenna system benefits. This is a difference resulting in an advantage we could and should exploit.  
>  
>Yes, except for the increased difficulty in talking to your nearest neighbors, who are probably not all in the same direction from you.  
>Multiple directional antennas, or a single rapidly steerable antenna (e.g., a phased array) are probably necessary.  
>

I also have to disagree with the fundamental assumption that the participants are stationary. "Back in the old days", before the transistor, the same could be said for AM, FM, and SSB. Should we architect a system based solely on one narrow slice of the user base? I think not.

TDMA and CDMA phones prove that small high quality, and fairly intelligent transceivers can be built for mobile use. The Newton 2000 is a proof that a hand held terminal with significant processing power exists. The US Robotics MOBITEXT and Motorola ARDIS modems (both in PCMCIA form factor) are proof that small mobile datacomm with interconnect to the internet (or other specialized mobile services) can be deployed today.

Couple any two of these together and you have a network ready highly mobile data terminal. The products exist today, just not in the HAM space. Why? Would you develop a product for 50,000 users (HAM) or 50 million (Commercial)?

To select a design center which mandates "stationary users" ensures that you are developing a system which will quickly become irrelevant. This ensures that products won't be developed by commercial companies who can get the economies of scale, forcing the price per "seat" to be too high. Lack of terminals will result in lack of use - which leads the FCC to ask why they are mis-allocating the spectrum space.

If we don't design for tomorrow, let's just not bother...

James McCartney

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# August 1997

Original source file: ss.9708

Source: [http://ftp.tapr.org/tapr\\_history/SIG\\_Archives/spread-spectrum-sig/mail\\_archive/ss.9708](http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9708)

## 1. pathloss

From: Glenn Elmore <ge@hpsadr2.sr.hp.com>  
Date: Fri, 1 Aug 1997 11:44:12 -0800 (PDT)  
To: ss@tapr.org (ge)  
Message-ID: <199708011844.AA155851052@hpsadr2.sr.hp.com>  
Rendered body type: text/plain

Barry McLarnon VE3JF commenting on Don's additional path loss reference:  
<deletion>

- > have a reflection with reflection coefficient of -1. Thus, depending on
- > the phase relationship between the direct and reflected path, you can
- > have anything from 6 dB enhancement wrt free space to complete
- > cancellation of the signal. I don't think that the 6 dB enhancement
- > condition is something you would want to depend on - it's not very
- > likely that you'll be that lucky, unless you're shooting over a smooth
- > treeless hill and get the clearance just right.

- > I don't disagree with your contention that a number of the order of 20
- > dB excess path loss is a reasonable thing to work with for grazing paths
- > in the real world - it's just that 6 dB gain for first fresnel clearance
- > that I have a problem with.

WRT the 6 dB gain number, years ago there was considerable discussion about whether this is \*ever\* obtainable in any kind of practical situation. Some of the early vhf EME attempts hoped to make use of this.

I remember at least one attempt involving someone with a w2 call, which I'm afraid I've forgotten, who was trying to use the 6 dB "setting sun effect" (you see the energy from two suns, for radio this could be 6 dB if it adds constructively) with a large 2M EME array from a New York City high rise. He had a shot to the east towards the water and was trying to do EME at sunrise to get a 6 dB benefit.

However, to my knowledge, there was never any improvement attributable to the effect. There was, I believe, some penalty due to having antennas looking at 290 K terra firma instead of a background of cold sky.

As Barry suggests, I'm afraid that we'd see the same result in trying to use the effect for digital networks. We'd not get any gain and things are generally worse for operating so close to grazing.

I also have some doubts about the 20 dB excess path loss for grazing paths, not because I doubt the theory so much as I think the practice would likely show a good deal more than this. My experience with typical amateur paths is that 'clean grazing' isn't common. Usually there is muck in the way. Worse, in most locales, the index of refraction is wandering around. While it may average 4/3 and usually be greater than unity it ends up effectively steering the Fresnel zones around. This is particularly a problem in marine environments and where the air is not dry and well-stirred.

Just getting amateur sites which are LOS out to the horizon in the necessary direction(s) isn't common. Most often there are trees, hills and houses. These typically are good for more than 20 dB excess loss all by themselves.

How does it go?

"In theory, it works in practice. In practice it doesn't."

Glenn n6gn

---

## 2. Re: [SS:1650] pathloss

From: Julian Fields <jfields@hotmail.com>  
Date: Sat, 02 Aug 1997 07:54:20 -0700  
To: ss@tapr.org  
Message-ID: <33E34A1C.6929@hotmail.com>  
Rendered body type: text/plain

Glenn Elmore wrote:

- > WRT the 6 dB gain number, years ago there was considerable discussion
- > about whether this is \*ever\* obtainable in any kind of practical situation.

I have never seen an article on the Fresnel gains or losses you guys are talking about.  
What is the 1 minute summary of what this is all about?

Thanks,  
Julian

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### 3. Re: pathloss

From: Don Lemke <wb9mjin@wb9mjin.ampr.org>  
Date: Sat, 02 Aug 1997 11:23:30 -0500  
To: ss@tapr.org  
Message-ID: <33E35F02.2C71@wb9mjin.ampr.org>  
Rendered body type: text/plain

Hi Glenn and Barry,

The idea of the DDMA-WAN, is that it is a MAN network, made up of very short paths. 500 yards to 5 miles max. Say a mean of 1 mile. If there is a hill in the way, u shoot to a neighbor that goes around it, or to the top of it.

Glenn, the EME comparison is not a correct comparison, because of the difference in Noise effects. As u point out, pointing at the ground with an EME Array greatly reduces the receive performance, due to terrestrial noise temperature, versus the celetrial noise temperature. In the DDMA-WAN system, ur always looking at terrestrial noise temperature, whether its a grazing or first Fresnel path.

Consequently the anectdote that a person trying to use 1 st Fresnel gain for EME, and was unsuccessful does not prove that the gain did not exist, since there is the probability that the terrestrial noise temperature to celestial noise temperature ratio may indeed have been bigger than 12 dB.

20 dB is a good number for short range grazing paths, based on experience working out this math. But, long range paths will have less grazing path excess attenuation. Since DDMA-WAN is a short path MAN application, the 20 dB is a good number. My experience is this works in practice. Long before I read the Bullington Paper, i had formulated the "45 mile effect" hypothesis. During band openings, less than 30 mile out stations would be less strong than stations at 45 miles, apparently. The effect I believe is due to the near flat earth conditions of a band opening, and the lesser Fresnell loss of longer grazing paths.

Allot of the interference paths will be shadowed anyway. Which would result in a sub-grazing path, and even more than 20 dB excess attenuation. Since antennas are at roof top levels, not up 100 feet or more on towers. The idea is to not exceed the local terrain variation, but to guide around within it. Knap-of-Earth paths, call it.

Even so, the versatility of the azimuthal scan antenna, allows for any unigue path problems to be be overcome, post-installation. Its the versatility of the scanning antenna that makes this practical, given the highly random, unpredicatable nature of low altitude MAN propagation.

The refraction variabilty is a key problem on 30 mile point-to-point terestrial paths, ala ATT. But, in this network it would not be so key, in regards to fade out of a path. This is because the paths are not over distances where the curve of the earth can be ignored, and thus the power density of the radiation is NOT distrubited vertically, up into the stratifying layers of the atmosphere. A 1 mile path, mid point, with a 30 degree elevation beamwidth antenna shoots RF up at 15 degrees. Making the -3 dB elevation at the midpoint of the path of only 1400 feet. The shorter the path, the more stable it is.

Refraction variability will effect reusability. As interference paths are over distances where the curve of the earth comes into play. Interference paths are normally occulted, may become grazing, or even first fresnel, in extreme situations. This is why power control is neccessary. U want interference due to these paths to be less in receive power, due to the distance, and equal, or less transmitter power. But, yes, the capacity of the network will decrease during periods when the effective earth radius is way less than average. Again, the versatility of a azimuthal scanning antenna can allow for the dynamic

reconfiguration of the network paths, to help deal with this.

You are also right, Glenn, in our present paradigm, that we do not have sites enuf to do what we want. That's why in the DDMA-WAN paradigm, each user has the azimuthal scan antenna, at maximum data rate, and for short range. The goal being, no third-party sites. But a network composed of, and all infrastructure provided by, the user sites. I call this "Infrastructureless design".

The large number of antenna/radios makes it practical to manufacture this equipment. When I first started in Packet Radio, I kinda latched onto the link hardware as my main interest. With the expectation that club's of users would want links, and confederations of clubs would want more links. This never happened, to a point where the enuf of the same stuff was being built, to make it economic. Each group had their own idea as to what they wanted, based on a narrow (our club's needs not the regional networks requirements), short term (what we need this year) planning. To get around this, the DDMA-WAN idea is to have maximum data rate equipment, at all sites, and enuf of this same hardware being built, to make its manufacture economic.

Barry, as to whether the 6 dB Fresnel Gain, of the 1st Fresnel clearance can be put to practical use, that will require real world experience. I am confident that the grazing loss of 20 dB is a REAL thing, and have experienced it directly in our packet networks here.

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73, Don.

AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]  
Internet: wb9mjn@wb9mjn.ampr.org@uugate.aim.utah.edu  
Website: <http://www.qth.com/antpanel>

---

#### 4. pathlosses and amateur networking

From: Glenn Elmore <glenn@santarosa.ampr.org>  
Date: Sun, 03 Aug 1997 19:48:35 -0700  
To: ss@tapr.org  
Message-ID: <33E54303.55D7@santarosa.ampr.org>  
Rendered body type: text/plain

Don writes:

> The idea of the DDMA-WAN, is that it is a MAN network, made up of  
> very short paths. 500 yards to 5 miles max. Say a mean of 1 mile. If  
> there is a hill in the way, u shoot to a neighbor that goes around it,  
> or to the top of it.  
>

> Glenn, the EME comparison is not a correct comparison, because of  
> the difference in Noise effects. As u point out, pointing at the ground  
> with an EME Array greatly reduces the receive performance, due to  
> terrestrial noise temperature, versus the celestial noise temperature.  
> In the DDMA-WAN system, ur always looking at terrestrial noise  
> temperature, whether its a grazing or first Fresnel path.

>  
> Consequently the anecdote that a person trying to use 1 st  
> Fresnel gain for EME, and was unsuccessful does not prove that the gain  
> did not exist, since there is the probability that the terrestrial noise  
> temperature to celestial noise temperature ratio may indeed have been  
> bigger than 12 dB.

It's true that the lack of the additional C/N doesn't prove anything  
(though noise increase at the horizon can be easily measured and I  
believe  
that in this particular case there was no additional C indicated).  
However, in both situations N is a problem that must be dealt with; each  
has a need for adequate C/N to achieve communication. I don't know of  
any real links where this potential increase has been exploited.

> 20 dB is a good number for short range grazing paths, based on  
> experience working out this math. But, long range paths will have less

My mention of the difficulty in harnessing the 6 dB improvement

factor is really quite incidental to my real nemesis. Even the theoretical  
20 dB incremental grazing loss factor you mention is not my biggest concern relative to limitations on the kinds of links I think might be practical in an amateur context. If we could, on average, expect paths which were only 20 dB below freespace loss, I think building a high speed amateur network would be, relatively speaking, a piece of cake.

I'm sorry to say that I believe that in an amateur context things are much worse than this.

> Allot of the interference paths will be shadowed anyway. Which  
> would result in a sub-grazing path, and even more than 20 dB excess  
> attenuation. Since antennas are at roof top levels, not up 100 feet or  
> more on towers. The idea is to not exceed the local terrain variation,  
> but to guide around within it. Knap-of-Earth paths, call it.

>  
>  
>  
> Even so, the versatility of the azimuthal scan antenna, allows  
> for any unique path problems to be overcome, post-installation. Its  
> the versatility of the scanning antenna that makes this practical,  
> given the highly random, unpredictable nature of low altitude MAN  
> propagation.

I think you already know of my strong belief in the value of antenna directivity for higher rate communications. Focussed/columated energy for communicating information effectively was central to the paper I presented at the 9th CNC as well as the main point emphasized by the 2 Mbps 10 GHz link, the 900/1200 MHz 230 kbps radios I'm currently using as well as the reason I've recently been playing with semiconductor laser diodes and photodetectors.

I agree with you that using directional antennas is a big win for RF networks, even better than power control in the amateur context. The benefits of directive antennas apply to both transmit and receive. I very much agree that they are necessary to 'work around' the local terrain and that typical antennas can't be on 100 foot towers. As I stated in the earlier papers, short paths are crucial.

So, what's my problem? It's that the incremental losses associated with getting a vhf-lightwave signal between 'typical' amateur locations, or even between a typical location and a typical hilltop repeater or node, are so much more than 20 dB that even with \*free\* hardware amateur radio can't support a network which can run fast and well enough to provide the necessary 'interesting' applications which would fund it. As a hobby, we're not close enough together, not organized well enough and not interested in it enough to overcome these problems in order to build significant wider area networks.

I think that your estimate of .5 to 5 mile paths is reasonable. Unfortunately my experience with paths of this length between residential users is that at UHF there can easily be 40 or more dB incremental loss from local clutter, foliage and intervening terra firma. From microwave-lightwave the situation is even worse.

I am presently typing this from the ham shack on a computer that is networked via two 25-mile RF hops before it hits Ethernet and T1 wire line to the Internet. But... I am only 3 miles away from the T1 'landing' and those miles are over virtually flat terrain. Laser light from 150' above the shack here could easily shine directly on an observer 150' above the ground there. But guess what, there's no way I can carry on a connection using this 10W 230 kbps hardware with antennas at heights of 30' and 60' as they presently are if I pointed directly (and avoided the extra 47 mile trip). There's not only 20 but 40-50 dB of incremental loss on the direct shot at 904 MHz! (not to mention the accompanying multipath)

I have carefully measured and monitored this 904 MHz hardware over more than a dozen paths almost continually for the last 5-6 years. These paths

have included totally unobstructed high level, high <-> low and low <-> low sites. They have been on mountaintops, flatlands, high and low antennas, commercial, residential and uninhabited. I've examined paths >75 miles and ones under 75 feet. I've watched what happens with a big spread of the K index, rain etc.

Paths that have worked well are very predictable and well-behaved, even if they are relatively long. On the 25 mile hop out of the shack things measure exactly as predicted by theory. I can even measure antenna gain over it almost as well as I can using a vector network analyzer across the back yard. Even subtle changes like water on the shake roof the antenna here is looking through are measurable. Some of these good paths are from residential locations to hilltops. They have worked similarly well. Good paths are a joy.

The gloom is in the paths and sites that haven't worked. These have, I think without exception, been end-user or end-RF(gateway) locations. As such, we had to use what we had, accept the foliage and clutter, and make-do using antenna height and gain as best we could. Very unfortunately for us all, I think these types of paths and sites are in the majority within the amateur world.

Perhaps as difficult as the bad paths themselves is the mindset and opinion of amateurs about vhf-and-up propagation. If I suggest to a local ham here that laserlight, 10 GHz ATV, and even perhaps 1.6 GHz GPS signals won't propagate well through his neighbor's tree, house or local shopping mall he will agree and say something about "line of sight" or maybe "that stuff is black-magic anyway". But if I suggest that the same forces are at work when he uses his 2M or 70 cm HT to work the local repeater he'll say "nah, it's a good path, it's FULL QUIETING". He misses the fact that only perhaps one \*millionth\* of the signal power a good path provides is reaching the other end. It is full quieting. It's enough, he's happy.

I've already gone over much of this on the web pages:  
<http://www.tapr.org/~n6gn>  
and I'm sure you've seen it already. Plots, pictures and text about some of the above mentioned paths and experiments are there. If readers of this are inclined to think "it can't be that bad" please at least have a look.

If this all sounds a bit negative I don't want it to be. I'm not trying to run down the idea of using antenna directivity and protocols to adapt to the local terrain. I think it's a great idea and fundamentally necessary. All my higher speed hardware and OCAR effort has required it. I just don't think it is all enough to make wide area high speed RF amateur networking viable with the user density (both kinds I'm afraid), sites, path lengths and budgets we have to work with.

Don, I appreciate your interest and perseverance in furthering amateur activities. Thanks for it. Don't take my discouragement personally. I certainly don't want to pour cold water on anyone who's trying to make a difference. I hope my current pessimism is unfounded.

73  
Glenn n6gn

---

## 5. Re: [SS:1650] pathloss

From: Lawrence Stoskopf <stoskopf@tri.net>  
Date: Mon, 04 Aug 1997 17:09:13 -0500  
To: ss@tapr.org  
Message-ID: <33E65309.16FD3767@tri.net>  
Rendered body type: text/plain

>  
>  
> WRT the 6 dB gain number, years ago there was considerable discussion  
> about whether this is \*ever\* obtainable in any kind of practical  
> situation.  
> Some of the early vhf EME attempts hoped to make use of this.  
>

Just heard Mike Staal of KLM talk at CSVHF about working single yagi



stations on 6 M EME when they were able to take advantage of the ground gain you are discussing.

W6STI's TA program uses ray tracing to explore this also.

N0UU

---

## 6. Re: [SS:1654] Re: pathloss

From: Lawrence Stoskopf <stoskopf@tri.net>  
Date: Mon, 04 Aug 1997 21:32:16 -0500  
To: ss@tapr.org  
Message-ID: <33E690B0.F5F8367C@tri.net>  
Rendered body type: text/plain

>  
>  
> Just heard Mike Staal of KLM

Boy did I blow this. Mike was, years ago, one of the owners of KLM and the designer of the KT-34, etc. Now is the owner, designer par excellence (sp?) at M2, (M squared) and continuing his magic. Sorry about the double post.

N0UU

---

## 7. RE: Error Condition Re: RE: 1632] Removal from list

From: Steve Rokita-C16786 <Steve\_Rokita-C16786@email.mot.com>  
Date: Tue, 5 Aug 1997 07:57:44 -0500  
To: "ss@tapr.org <ss@tapr.org, [Steve Rokita-C16786 <Steve\_Rokita-C16786@email.mot.com>]@pobox.mot.com  
Message-ID: <51F347B016ADD011963200805FC14562C2AF46@email1.wes.mot.com>  
Rendered body type: text/plain

listproc@tapr.org

> GET ME OFF THAT LIST  
> !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!  
>  
> I HAD ENOUGH  
> !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!  
> !!  
> !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!  
>  
> I'M GOING INSANE  
> !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!#####\$\$\$\$\$\$\$\$\$\$  
> \$\$  
> \$\$\$\$\$\$%>%>%>%>%>%>%>%  
>  
> WHERE IS THE NURSE ??????????  
>  
>  
> > -----Original Message-----  
> > From: lehoda01@starbase.spd.louisville.edu%INTERNET  
> >  
> > [SMTP:lehoda01#064#starbase.spd.louisville.edu%INTERNET@email.mot.com]  
> > Sent: Monday, July 21, 1997 7:24 PM  
> > To: ss@tapr.org%INTERNET  
> > Subject: [SS:1632] Removal from list  
> >  
> > Could I please be removed from this list.  
> > Thanks,  
> > Lee

---

## 8. RE: 1635] Re: Removal from list

From: Steve Rokita-C16786 <Steve\_Rokita-C16786@email.mot.com>  
Date: Tue, 5 Aug 1997 09:11:31 -0500  
To: "ss@tapr.org <ss@tapr.org">@mothost.mot.com  
Message-ID: <51F347B016ADD011963200805FC14562C2AF48@email1.wes.mot.com>  
Rendered body type: text/plain

Send a message to 'listproc@tapr.org' with one of the following lines as the message portion:

unsubscribe <list>  
signoff <list>

> -----Original Message-----  
> From: nielsen@primenet.com%INTERNET

```

> [SMTP:nielsen#064#primenet.com%INTERNET@email.mot.com]
> Sent: Tuesday, July 22, 1997 10:55 AM
> To: ss@tapr.org%INTERNET
> Subject: [SS:1635] Re: Removal from list
>
> On Tue, 22 Jul 1997, Monte Tremont wrote:
>
> > I am also trying to get disconnected from all @tapr.org that
> > constantly clog my Email. Also lately I now receive a copy of
> > (as BCC)
> > every one else that tries to leave this newsgroup. HELP TAPR
> > !!!
> >
> >
> > _____ Reply Separator
> >
> > Subject: [SS:1632] Removal from list
> > Author: Leo E Hodapp <lehoda01@starbase.spd.louisville.edu> at
> > INTERNET
> > Date: 7/21/97 7:23 PM
> >
> >
> > Could I please be removed from this list.
> > Thanks,
> > Lee
> >
> >
> > From the directions:
> >
> > Send a message to 'listproc@tapr.org' with one of the following lines
> > as
> > the message portion:
> >
> > unsubscribe <list>
> > signoff <list>
> >
> > Bob
> >
> > ----
> > Bob Nielsen Internet: nielsen@primenet.com
> > Tucson, AZ AMPRnet: w6swe@w6swe.ampr.org
> > AX.25: w6swe@wb7t1s.az.usa.noam
> > http://www.primenet.com/~nielsen

```

## 9. pathloss, grounds and groundgain

```

From: Glenn Elmore <ge@hpsadr2.sr.hp.com>
Date: Tue, 5 Aug 1997 09:56:17 -0800 (PDT)
To: ss@tapr.org
Message-ID: <199708051656.AA222330178@hpsadr2.sr.hp.com>
Rendered body type: text/plain

```

N0UU wrote:

```

> Just heard Mike Staal of KLM talk at CSVHF about working single yagi
> stations on 6 M EME when they were able to take advantage of the ground
> gain you are discussing.

```

```

> Mike was, years ago, one of the owners of KLM and
> the designer of the KT-34, etc. Now is the owner, designer par
> excellence (sp?) at M2, (M squared) and continuing his magic.

```

At low enough frequencies, where you can get a well controlled ground environment even out to the far field (non absorbing and with irregularities small enough in terms of a wavelength to make specular reflections possible) it can be possible to use groundgain to advantage.

In this sense, I suppose if one considers any situation where the ground is used as part of the antenna that "ground gain" is being exploited. Even a ground mounted quarter wave on HF does this to reflect an image element which is underground. Lou Ancieux, wb6nmt, used a rhombic for 6M EME (maybe about the same time Mike, who was also the "M" in KLM, was referring to at CSVHF). Lou's rhombic was on utility poles out in the middle of a very large plain, actually the Naval Receiving Facility site near Sonoma Calif, and was also using the ground to generate an image.

Perhaps whether one views the ground as providing an image signal which can be received or generating an image antenna, the same 6 dB results. However, from either view, the ground has to be mirrorlike at the wavelength of interest. In the original context that Don was

suggesting, one of common amateur sites and vhf-microwave wavelength, I doubt that the availability of that kind of a ground can be counted on.

In the multitude of measurements I've made of quite a variety of paths at 900 MHz I have often seen signals reach but I've never yet seem them exceed the free space value. Measurement error has been small enough on most occasions that I could have identified it.

In any case, the 6 dB "groundgain" value and even the 20 dB grazing number are relatively small potatoes compared to the degradation that from my experience I'd say the majority of amateur sites and paths encounter.

Glenn n6gn

---

## 10. Re: pathlosses and amateur networking

From: Don Lemke <wb9mjn@wb9mjn.ampr.org>  
Date: Mon, 04 Aug 1997 11:12:55 -0500  
To: ss@tapr.org  
Message-ID: <33E5FF76.1DF7@wb9mjn.ampr.org>  
Rendered body type: text/plain

Hi Glenn,

> Don writes:

>  
> > The idea of the DDMA-WAN, is that it is a MAN network, made up of  
> > very short paths. 500 yards to 5 miles max. Say a mean of 1 mile. If  
> > there is a hill in the way, u shoot to a neighbor that goes around it,  
> > or to the top of it.

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> > the difference in Noise effects. As u point out, pointing at the ground  
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> > (though noise increase at the horizon can be easily measured and I  
> > believe  
> > that in this particular case there was no additional C indicated).  
> > However, in both situations N is a problem that must be dealt with; each  
> > has a need for adequate C/N to achieve communication. I don't know of  
> > any real links where this potential increase has been exploited.

But Glenn, was the N corrected for in the EME anecdote that u related? I m not relying on a 6 dB less path loss. I am relying on a 20 dB between nearest neighbors, and the next reuse (grazing).

>  
> >  
> > 20 dB is a good number for short range grazing paths, based on  
> > experience working out this math. But, long range paths will have less

>  
> > My mention of the difficulty in harnessing the 6 dB improvement  
> > factor is really quite incidental to my real nemesis. Even the  
> > theoretical  
> > 20 dB incremental grazing loss factor you mention is not my biggest  
> > concern relative to limitations on the kinds of links I think might  
> > be practical in an amateur context. If we could, on average, expect  
> > paths which were only 20 dB below freespace loss, I think building a  
> > high  
> > speed amateur network would be, relatively speaking, a piece of cake.  
> > I'm sorry to say that I believe that in an amateur context things  
> > are much worse than this.

DDMA-WAN is versatile point to point, Glenn. U simply do not use bad paths. The antenna points to paths that work. The problem with "Hub Master" is that the antennas are fixed, and the environment is variable,

within the time constant of the environment.

> > Allot of the interference paths will be shadowed anyway. Which  
> > would result in a sub-grazing path, and even more than 20 dB excess  
> > attenuation. Since antennas are at roof top levels, not up 100 feet or  
> > more on towers. The idea is to not exceed the local terrain variation,  
> > but to guide around within it. Knap-of-Earth paths, call it.  
> >  
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> at the 9th CNC as well as the main point emphasized by the 2 Mbps 10 GHz  
> link, the 900/1200 MHz 230 kbps radios I'm currently using as well as  
> the reason I've recently been playing with semiconductor laser diodes  
> and photodetectors.  
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> I agree with you that using directional antennas is a big win for  
> RF networks, even better than power control in the amateur context. The  
> benefits of directive antennas apply to both transmit and receive.  
> I very much agree that they are necessary to 'work around' the local  
> terrain  
> and that typical antennas can't be on 100 foot towers. As I stated in  
> the earlier papers, short paths are crucial.  
>

I guess this is where we compare HubMaster, to DDMA-WAN. HubMaster is too expensive. It needs a radio and feedline and port for each direction, and a switch function to hook all those ports up. The DDMA-WAN needs only one radio/feedline/port for all directions. DDMA-WAN uses nearest neighbor routing, as proposed by Karn and others, and power control DSSS to get maximum reuse out of the resource. HubMaster is a miniature version of commercial point to point. DDMA-WAN is a new concept to Ham Radio, and probably commercial radio, too.

> So, what's my problem? It's that the incremental losses associated  
> with  
> getting a vhf-lightwave signal between 'typical' amateur locations, or  
> even between a typical location and a typical hilltop repeater or node,  
> are so much more than 20 dB that even with \*free\* hardware amateur radio  
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> the necessary 'interesting' applications which would fund it. As a  
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> we're not close enough together, not organized well enough and not  
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> I think that your estimate of .5 to 5 mile paths is reasonable.  
> Unfortunately my experience with paths of this length between  
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> users is that at UHF there can easily be 40 or more dB incremental loss  
> from local clutter, foliage and intervening terrain. From  
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> and  
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> using this 10W 230 kbps hardware with antennas at heights of 30' and 60'  
> as they presently are if I pointed directly (and avoided the extra 47  
> mile trip). There's not only 20 but 40-50 dB of incremental loss on the  
> direct shot at 904 MHz! (not to mention the accompanying multipath)

>

This is exactly why point to point networks need to be versatile, in amateur service. And to get enough versatility, we need standard hardware, and that standard hardware needs to have azimuthal scan capability. And to get azimuthal scan capability we need DMF DSSS for rapid lock-up, and nearest neighbor routing, and automatic power control, so as to not waste the resource. It all follows Glen, but it's not Hubmaster.

BTW, a lot of 904 multipath can be done away with Panel antennas. This is how GSM even has a chance of working, with a 230 KB/s data rate, and that lousy .3 GMSK modulation!

> I have carefully measured and monitored this 904 MHz hardware over more  
> than a dozen paths almost continually for the last 5-6 years. These  
> paths  
> have included totally unobstructed high level, high <-> low and low <->  
> low  
> sites. They have been on mountaintops, flatlands, high and low antennas,  
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> over it almost as well as I can using a vector network analyzer across  
> the back yard. Even subtle changes like water on the shake roof the  
> antenna  
> here is looking through are measurable. Some of these good paths are  
> from  
> residential locations to hilltops. They have worked similarly well.  
> Good paths are a joy.  
>

This is why a DDMA-WAN controller would need to actively measure path performance to the nearest neighbors, and keep a table of them, continually. It also needs a way to discover new neighbors, and failed neighbors, continually and automatically. We can't assign a Propagation engineer to each Ham's home QTH! The DDMA-WAN hardware has to do this Propagation engineer thing, by itself. And this is not too hard to do, as pointed out by the Flexnet system, or even by sending BER test pseudo Random sequences, as demonstrated by K9NG (and yourself?) to the known nearest neighbors.

> The gloom is in the paths and sites that haven't worked. These have,  
> I think without exception, been end-user or end-RF(gateway) locations.  
> As such, we had to use what we had, accept the foliage and clutter, and  
> make-do using antenna height and gain as best we could.  
> Very unfortunately for us all, I think these types of paths and sites  
> are in the majority within the amateur world.  
>

With DDMA-WAN, you use the shotgun approach, rather than the commercial point to point approach, of site selection. Everybody gets a DDMA-WAN radio/antenna, and the things figure out what paths work, on their own. Then if there is a hole, you fill it by recruiting a new ham, or if need be, a third party site or heck, an Internet link. This way, the Third Party sites are much lower priority, and do not block network construction. This year's money is not all sunk into a place that just does not have a path to any of the others. Sites have become impossible to get, and even if you get one, they may get bad, for the intended usage. Our Gurnee site developed a massive power line noise problem, to the point that it was useless. Our Downtown site was a victim of Reaganomics, when new buildings, partially funded by the government, were put up just west of it. It becomes impossible to get into secured locations, when anybody has any time. Let alone getting people with time, to have time all at the same time. DDMA-WAN puts the resources where people WILL work on them. Rather than off in an ivory tower.

> Perhaps as difficult as the bad paths themselves is the mindset and  
> opinion of amateurs about vhf-and-up propagation. If I suggest to  
> a local ham here that laserlight, 10 GHz ATV, and even perhaps  
> 1.6 GHz GPS signals won't propagate well through his neighbor's tree,  
> house or local shopping mall he will agree and say something about

> "line of sight" or maybe "that stuff is black-magic anyway". But if I  
> suggest that the same forces are at work when he uses his 2M or  
> 70 cM HT to work the local repeater he'll say "nah, it's a good  
> path, it's FULL QUIETING". He misses the fact that only perhaps  
> one \*millionth\* of the signal power a good path provides is reaching  
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> and I'm sure you've seen it already. Plots, pictures and text about  
> some of the above mentioned paths and experiments are there. If  
> readers of this are inclined to think "it can't be that bad"  
> please at least have a look.  
>  
> If this all sounds a bit negative I don't want it to be. I'm not trying  
> to run down the idea of using antenna directivity and protocols to adapt  
> to the local terrain. I think it's a great idea and fundamentally  
> necessary.

Yes, I've been where You are Glenn, with this. It was this pessimism  
that led me to reach out, and see if there was a way around it. And, on  
the TCP newsgroup this DDMA-WAN idea all kinda just gelled. I may have  
the clearest vision of it, at the moment, but I hardly am totally  
responsible for it. And it may not even work, anyway. This is really a  
research type thing.

> All my higher speed hardware and OCAR effort has required it.  
> I just don't think it is all enough to make wide area high speed  
> RF amateur networking viable with the user density  
> (both kinds I'm afraid), sites, path lengths and budgets we have to  
> work with.  
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> Don, I appreciate your interest and perseverance in furthering amateur  
> activities. Thanks for it. Don't take my discouragement personally,  
> I certainly don't want to pour cold water on anyone who's trying to  
> make a difference. I hope my current pessimism is unfounded.  
>  
> 73  
> Glenn n6gn  
>  
>

Thanks for the comments, Glenn. We've gotten to a point in Amateur  
Packet, where the traditional radio techniques just lead to a pessimism.  
I can agree with that! Which is why I am pushing a non-traditional  
system.

--

73, Don.

AMPRNet : [wb9mjn@wb9mjn.ampr.org](mailto:wb9mjn@wb9mjn.ampr.org)[44.72.98.19]  
Internet: [wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu](mailto:wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu)  
Website: <http://www.qth.com/antpanel>

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## 11. DDMA

From: Matt Ettus <[mne@cmu.edu](mailto:mne@cmu.edu)>  
Date: Thu, 07 Aug 1997 11:43:23 -0400  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <33E9ED1B.D0560645@cmu.edu>  
Rendered body type: text/plain

Assuming that the rest is "Division Multiple Access", what does the  
first "D" in DDMA stand for?

Thanks  
Matt

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## 12. Re: DDMA

From: Don Lemke <[wb9mjn@wb9mjn.ampr.org](mailto:wb9mjn@wb9mjn.ampr.org)>  
Date: Thu, 07 Aug 1997 14:34:52 -0500  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <33EA235C.116D@wb9mjn.ampr.org>  
Rendered body type: text/plain

Hi Matt,

re:

> Assuming that the rest is "Division Multiple Access", what does the  
> first "D" in DDMA stand for?  
>  
> Thanks

The first D stands for Directivity. As in the use of antenna directivity to provide for isolated paths.

--

73, Don.

AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]  
Internet: wb9mjn@wb9mjn.ampr.org@uugate.aim.utah.edu  
Website: <http://www.qth.com/antpanel>

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### 13. pathloss and DDMA

From: glenn@santarosa.ampr.org (Glenn Elmore)  
Date: Thu, 07 Aug 97 21:24:10 PST  
To: ss@tapr.org  
Message-ID: <16088@santarosa.ampr.org>  
Rendered body type: text/plain

Don,

Thanks for the reply. Sorry to be slow to get back but I guess my entry in the distribution disappeared.

I guess our difference is that I am even more pessimistic than you understand. After the last several years, which have certainly had a degree of success in shipping packets around, I am coming to the opinion that the typical amateur location has \*no\* paths which are good enough to support enough information to develop and maintain the necessary h/w and infrastructure.

I'll allow the limit of directionality, use the highest gain antenna or any antenna of your choice which you can practically install at an amateur site and try to find a neighbor to work. Period. Yes, there will be a few but for the most part you won't be able to support enough data to make the whole thing float.

At this point if you can't at least get 10 X 56 kbps to the user you'll not have any neighbors who want to participate within quite a large distance, on average. I maintain that the density is so low, hams per unit area, that the 40-70 dB excess loss that exists without large towers (much more than 60' around here) kills the thing.

I have extra radios sitting on the floor capable of .5 Mbps but no place to deploy them.

I find no place in the EM spectrum where practically sized and located emitters and receptors can communicate at high enough rate to support their own installation (even if we had applications which were somehow much more appealing than the current phoneline competition).

I can build hardware that can do many hundreds of Mbps over significant distance if it would do any good. I can't provide the kinds of paths that are necessary to make it work even with complete flexibility to chose the antenna(s).

To see what I'm talking about, make a list of all users within 25 miles or so who would be willing to committ to an amateur RF network assuming some level of performance, you name what you think will get them to donate \$500 and >2 hours a week. Now, \*carefully\* analyze the best set of paths between them including extreme detail as to their antenna locations and heights paying particular attention to elevation profiles and intervening foliage, clutter, buildings etc. Next use Longley-Rice, or better yet go \*measure\* the pathloss between them all (make an measurement of the multipath while you're at it even though we'll assume DSSS to fix it). Now apply Shannon and find what datarate you can support. It will be \*very\* disappointing if it's anything like I have seen.

Maybe I'm just in need of a break but I see no way that any protocol or scheme can beat Shannon and at this point I think SHannon has us beat given our resources and motivation within AR.

Glenn n6gn

---

### 14. Re: [SS:1662] pathloss and DDMA

From: frussle@erols.com (Jake Brodsky)  
Date: Fri, 08 Aug 1997 13:05:20 GMT  
To: ss@tapr.org  
Message-ID: <33ec0a06.633030@smtp.erols.com>

On Thu, 7 Aug 1997 23:56:53 -0500 (CDT), Glenn wrote:

>I guess our difference is that I am even more pessimistic than you  
>understand. After the last several years, which have certainly had  
>a degree of success in shipping packets around, I am coming to  
>the opinion that the typical amateur location has \*no\* paths  
>which are good enough to support enough information to develop  
>and maintain the necessary h/w and infrastructure.

I've been following this thread for some time. And I agree with this statement. I work in a communications and telemetry section within a water utility. Among other things, we have built and maintain a T3 6 GHz industrial network. Ham Radio is never going to compete with this scale of money and technology. Given the way that bandwidth usage has exploded, we hams don't have the spectrum, the sites, or the technology to keep up. So are we "doomed"? I think not.

> I'll allow the limit of directionality, use the highest gain antenna  
>or any antenna of your choice which you can practically install at  
>an amateur site and try to find a neighbor to work. Period.  
>Yes, there will be a few but for the most part you won't be able  
>to support enough data to make the whole thing float.

You're right. Dishes are expensive to purchase and even more expensive to put on a tower (wind-loading). Radios are even more difficult to build and align for the average ham.

> At this point if you can't at least get 10 X 56 kbps to the user  
>you'll not have any neighbors who want to participate within quite  
>a large distance, on average. I maintain that the density is so low,  
>hams per unit area, that the 40-70 dB excess loss that exists without  
>large towers (much more than 60' around here) kills the thing.

True, but do we really need this kind of performance? Is this what Ham Radio is all about?

> I have extra radios sitting on the floor capable of .5 Mbps but  
>no place to deploy them.  
> I find no place in the EM spectrum where practically sized and  
>located emitters and receptors can communicate at high enough rate  
>to support their own installation (even if we had applications which  
>were somehow much more appealing than the current phoneline competition).  
> I can build hardware that can do many hundreds of Mbps over significant  
>distance if it would do any good. I can't provide the kinds of paths  
>that are necessary to make it work even with complete flexibility to  
>choose the antenna(s).  
> To see what I'm talking about, make a list of all users within 25 miles  
>or so who would be willing to commit to an amateur RF network assuming  
>some level of performance, you name what you think will get them  
>to donate \$500 and >2 hours a week. Now, \*carefully\* analyze the best  
>set of paths between them including extreme detail as to their antenna  
>locations and heights paying particular attention to elevation profiles  
>and intervening foliage, clutter, buildings etc. Next use Longley-Rice,  
>or better yet go \*measure\* the pathloss between them all (make an  
>measurement of the multipath while you're at it even though we'll assume  
>DSSS to fix it). Now apply Shannon and find what data rate you can  
>support. It will be \*very\* disappointing if it's anything like I  
>have seen.  
> Maybe I'm just in need of a break but I see no way that any  
>protocol or scheme can beat Shannon and at this point I think  
>Shannon has us beat given our resources and motivation within AR.

No offense Glenn, but maybe your expectations are too high. Ham radio has never been about throughput. In fact, it's just the opposite: Ever since the hobby began, throughput and usefulness have deliberately been limited so that we don't step on any of the big common carrier interests.

What we're about is training, study, experimentation, and (most of all) having fun. Practicality, dependability, and capacity are nearly undesirable features if they become commonplace. Did you think SSTV was ever supposed to be practical? What good has amateur RTTY ever been to the public as a whole? EME?

Ham Radio was never intended to be a substantial subnet for telegrams, telephony, or the Internet. True, we probably won't be able to match the bandwidth, the reliability, or the availability of commercial services. We'll never even get close.



Spread Spectrum communications should be about developing medium to slow speed (<100 kbps), long haul, autonomous radio station gear. We should be developing adaptable radio gear so that we can brag about how little we used to get across very lossy paths. In this respect, bandwidth and power use should be adjustable so that we can work the longest path.

Our services to the public in an emergency capacity has always been a function of our independence of a network. When disaster or war destroys common carrier networks, we become a useful medium of communication by virtue of our numbers, our independence of those networks, and technical knowledge/simplicity. Using those features we hams can communicate long after most public common carriers cease functioning.

That's what our hobby is about. I make my living building big, expensive, and reliable communications networks. Why would anyone do this for free?

73,

Jake Brodsky, AB3A <mailto:frussle@erols.com>  
"Beware of the massive impossible!"

---

## 15. 'Ham' data infrastructure (was: pathloss and DDMA)

From: Jeff King <[jeff@mich.com](mailto:jeff@mich.com)>  
Date: Fri, 08 Aug 1997 12:53:49 -0400  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <3.0.3.32.19970808125349.037b13f0@mail.mich.com>  
Rendered body type: text/plain

At 08:07 AM 8/8/97 -0500, Jake Brodsky wrote:  
>On Thu, 7 Aug 1997 23:56:53 -0500 (CDT), Glenn wrote:  
>  
>>I guess our difference is that I am even more pessimistic than you  
>>understand.

<clip>

>  
>I've been following this thread for some time.

Me too. I make a comment on this about once every 6 months or so. Its time again. Please don't take anything to personal as its more general spouting as opposed to personal commentary.

>  
>> At this point if you can't at least get 10 X 56 kbps to the user  
>>you'll not have any neighbors who want to participate within quite  
>>a large distance, on average. I maintain that the density is so low,  
>>hams per unit area, that the 40-70 dB excess loss that exists without  
>>large towers (much more than 60' around here) kills the thing.  
>  
>True, but do we really need this kind of performance? Is this what  
>Ham Radio is all about?

I believe Glenn is talking about a decent data network. I'd say this is a minimum requirement. At this point I'm only doing 115kbps on a daily basis on amateur radio (STA) and am interested in going faster shortly.

>  
>No offense Glenn, but maybe your expectations are too high. Ham radio  
>has never been about throughput. In fact, it's just the opposite:  
>Ever since the hobby began, throughput and usefulness have  
>deliberately been limited so that we don't step on any of the big  
>common carrier interests.

This is the problem with "ham radio". I'm a AMATEUR RADIO operator and I don't have any preconceptions of what I am capable of doing. I just go do it. I've not been a 'ham' for at least 10 years although I use my amateur license on a daily basis. If you want to operate 150baud rty then have at it. Just don't try to stop me from my 'high' throughput experimentation/operations.

>  
>Ham Radio was never intended to be a substantial subnet for telegrams,  
>telephony, or the Internet.

Hope this isn't a rule or I'll be in big trouble ;-)

>True, we probably won't be able to match  
>the bandwidth, the reliability, or the availability of commercial  
>services. We'll never even get close.

We certainly can match or exceed the endpoint bandwidth of many commercial services on a individual basis. As the rest of your statement requires the resources of a organization to archive, I'll have to agree with you at this time.

>  
>Spread Spectrum communications should be about developing medium to  
>slow speed (<100 kbps), long haul, autonomous radio station gear. We  
>should be developing adaptable radio gear so that we can brag about  
>how little we used to get across very lossy paths. In this respect,  
>bandwidth and power use should be adjustable so that we can work the  
>longest path.

While I think high speed should be part of this equation, I agree with this.

>That's what our hobby is about. I make my living building big,  
>expensive, and reliable communications networks. Why would anyone do  
>this for free?

No-one should give their labor for free. This amazes me many times that so many are willing to short change themselves in this regard. I see a sizable market in high speed amateur radio if it could only be marketed to the right people. Most of these people aren't in the amateur service right now. And that brings me to my point.

Glenn, you appear to be selling and/or basing your network plans on the existing 'ham' population. Respectfully, I think this is the basis for long term failure. While things may be different were you live, when I have done SS presentations to 'ham' clubs, I would generally get glazed over stares from most of the 'hams'. A few would say they are interested in operating this new 'mode'. One amateur might get "the vision". The rest of the 'hams' were interested in getting onto contesting or what 'bad ham' is doing on the repeater. When I would do similar demonstrations at computer clubs a significant portion of the group could see what SS could do for them. I would be surrounded after the meeting by people asking in depth questions.

When it comes to high speed networking, and in particular SS, most 'hams' don't have "the vision". What is "the vision"? It is the ability not to see spread spectrum as simply a new mode but a completely new paradigm for the usage of the radio spectrum. With the (hoped for) changes in the SS rules, the availability of cheap Part 15 equipment and the no-code tech license, I think the future of amateur SS lies in the computer experimenters.

In other words, we should stop trying to sell ice cubes to Eskimos.

-Jeff King WB8WKA

---

## 16. Re: [SS:1664] 'Ham' data infrastructure (was: pathloss and DDMA)

From: frussle@erols.com (Jake Brodsky)  
Date: Fri, 08 Aug 1997 20:25:25 GMT  
To: ss@tapr.org  
Message-ID: <33eb6879.949874@smtp.erols.com>  
Rendered body type: text/plain

On Fri, 8 Aug 1997 12:01:27 -0500 (CDT), you wrote:

>At 08:07 AM 8/8/97 -0500, Jake Brodsky wrote:  
>>On Thu, 7 Aug 1997 23:56:53 -0500 (CDT), Glenn wrote:  
>>  
>>>I guess our difference is that I am even more pessimistic than you  
>>>understand.  
>  
><clip>  
>  
>>  
>>I've been following this thread for some time.  
>  
>Me too. I make a comment on this about once every 6 months or so. Its

>time again. Please don't take anything to personal as its more general  
>spouting as opposed to personal commentary.  
>  
>>  
>>> At this point if you can't at least get 10 X 56 kbps to the user  
>>>you'll not have any neighbors who want to participate within quite  
>>>a large distance, on average. I maintain that the density is so low,  
>>>hams per unit area, that the 40-70 dB excess loss that exists without  
>>>large towers (much more than 60' around here) kills the thing.  
>>  
>>True, but do we really need this kind of performance? Is this what  
>>Ham Radio is all about?  
>  
>I believe Glenn is talking about a decent data network. I'd say this  
>is a minimum requirement. At this point I'm only doing 115kbps on

A minimum requirement for what? Just what do you envision building?

>a daily basis on amateur radio (STA) and am interested in going faster  
>shortly.

>>No offense Glenn, but maybe your expectations are too high. Ham radio  
>>has never been about throughput. In fact, it's just the opposite:  
>>Ever since the hobby began, throughput and usefulness have  
>>deliberately been limited so that we don't step on any of the big  
>>common carrier interests.  
>  
>This is the problem with "ham radio". I'm a AMATEUR RADIO operator and  
>I don't have any preconceptions of what I am capable of doing. I just  
>go do it. I've not been a 'ham' for at least 10 years although I use  
>my amateur license on a daily basis. If you want to operate 150baud  
>rtty then have at it. Just don't try to stop me from my 'high' throughput  
>experimentation/operations.

I'm not advocating that 150 baud RTTY is good enough for everyone.  
What I'm trying to say is that organized trunked systems are not  
likely to get funded in what is, after all, an Amateur (unpaid)  
operation.

>>  
>>Ham Radio was never intended to be a substantial subnet for telegrams,  
>>telephony, or the Internet.  
>  
>Hope this isn't a rule or I'll be in big trouble ;-)

I was writing about intent, not regulation...

>>True, we probably won't be able to match  
>>the bandwidth, the reliability, or the availability of commercial  
>>services. We'll never even get close.  
>  
>We certainly can match or exceed the endpoint bandwidth of many  
>commercial services on a individual basis. As the rest of your  
>statement requires the resources of a organization to archive, I'll  
>have to agree with you at this time.

I'm not sure what you mean by this statement. I can purchase an ISDN  
line from my phone company and beat even that rate, with less effort  
and less money.

If ham operators manage to beat the access speeds to most Internet  
providers, it won't be for long. ADSL and other technologies can put  
radio capacity to shame. Face it, we don't have a prayer of matching  
the reliability and bandwidth of landline communications.

>>Spread Spectrum communications should be about developing medium to  
>>slow speed (<100 kbps), long haul, autonomous radio station gear. We  
>>should be developing adaptable radio gear so that we can brag about  
>>how little we used to get across very lossy paths. In this respect,  
>>bandwidth and power use should be adjustable so that we can work the  
>>longest path.  
>  
>While I think high speed should be part of this equation, I agree with  
>this.

I think high speed would be nice too, but only as a "lets see what it  
takes to do this" kind of deal, not as a goal in itself...

>>That's what our hobby is about. I make my living building big,

>>expensive, and reliable communications networks. Why would anyone do  
>>this for free?  
>  
>No-one should give their labor for free. This amazes me many times that  
>so many are willing to short change themselves in this regard. I see  
>a sizable market in high speed amateur radio if it could only be  
>marketed to the right people. Most of these people aren't in the  
>amateur service right now. And that brings me to my point.  
>  
>Glenn, you appear to be selling and/or basing your network plans  
>on the existing 'ham' population. Respectfully, I think this is the  
>basis for long term failure. While things may be different were you  
>live, when I have done SS presentations to 'ham' clubs, I would  
>generally get glazed over stares from most of the 'hams'. A few would  
>say they are interested in operating this new 'mode'. One amateur might  
>get "the vision". The rest of the 'hams' were interested in getting  
>onto contesting or what 'bad ham' is doing on the repeater. When  
>I would do similar demonstrations at computer clubs a significant  
>portion of the group could see what SS could do for them. I would  
>be surrounded after the meeting by people asking in depth questions.  
>  
>When it comes to high speed networking, and in particular SS, most  
>'hams' don't have "the vision". What is "the vision"? It is the  
>ability not to see spread spectrum as simply a new mode but a  
>completely new paradigm for the usage of the radio spectrum.  
>With the (hoped for) changes in the SS rules, the availability of  
>cheap Part 15 equipment and the no-code tech license, I think the  
>future of amateur SS lies in the computer experimenters.  
>  
>In other words, we should stop trying to sell ice cubes to  
>Eskimos.

Jeff, what do you envision for the future of Amateur (ham) Radio? A  
computer hobbyist's network? For what? So they can send radio mail  
in addition to e-mail? So they can post messages to HamNet like we do  
in USENET? So they can send a JPEG coast to coast only a few orders  
of magnitude slower than the far less expensive Internet?

I have always contended this hobby is about radio. Radio design,  
radio technology, radio construction, radio installation, radio  
operation, radio coordination, etc.... Where is the Computer in  
Amateur Radio? Sure you can use one with a radio. I can also fly an  
airplane with a radio. I can use a video camera with a radio (an ATV  
transmitter for sending video). That doesn't mean I market the hobby  
to aviators or TV fanatics.

There is only one reason our hobby still exists: We train the next  
generation of scientists, engineers, technicians, and yes, technology  
managers, about the state of the art of radio. In that light, spread  
spectrum is just another facet of radio. We have a training ground.  
Speed and utility are not the issues. They never were; and chances  
are they never will be allowed to become one, either. Hopefully,  
we're doing all this because we want to learn about radio --not  
because we're trying to build Internet II.

This hobby will never grow much beyond impracticality. It was never  
supposed to. It's nice to see that you have managed to find some  
utility in your learning efforts. But the hobby as a whole will never  
be more than a testing or a learning ground. The day it does, is the  
day you'll call it something else: A Job.

73,  
Jake Brodsky, mailto:frussle@erols.com  
"Nearly fifty percent of all graduates came from  
the bottom half of the class."

## 17. Re: N6GN's comments

From: Matt Ettus <mne@cmu.edu>  
Date: Fri, 08 Aug 1997 18:25:55 -0400  
To: ss@tapr.org  
Message-ID: <33EB9CF3.732A597E@cmu.edu>  
Rendered body type: text/plain

Your comments on the lack of sufficient density of seriously interested  
ham is quite true. When we can't even convince people to use TCP/IP  
instead of NetROM or ROSE or even nothing at all...

On the other hand, what about completely avoiding the bad paths issue...

Why not a satellite based system, a la VSAT. What about a CDMA VSAT system -- it solves the density problem, the bad paths problem, the routing problem, the coverage problem, etc.

Obviously its not a cheap/simple alternative in the near term, but we could get some serious throughput with low power and small dishes. Maybe 10Ghz Uplink, 24 GHz down. Thats 800Mhz of pretty much unused spectrum. No interference problems either...

73  
Matt Ettus  
N2MJI  
mne@cmu.edu

---

## 18. Re: 'Ham' data infrastructure (was: pathloss and DDMA)

From: Jeff King <jeff@mich.com>  
Date: Fri, 08 Aug 1997 22:19:25 -0400  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19970808221925.034b0b50@mail.mich.com>  
Rendered body type: text/plain

At 03:32 PM 8/8/97 -0500, Jake Brodsky wrote:

>  
>>>True, we probably won't be able to match  
>>>the bandwidth, the reliability, or the availability of commercial  
>>>services. We'll never even get close.  
>>  
>>We certainly can match or exceed the endpoint bandwidth of many  
>>commercial services on a individual basis. As the rest of your  
>>statement requires the resources of a organization to archive, I'll  
>>have to agree with you at this time.  
>  
>I'm not sure what you mean by this statement. I can purchase an ISDN  
>line from my phone company and beat even that rate, with less effort  
>and less money.

Glenn was referring to 10X56Kbaud (560kbps), I was thinking of a off the shelf wavelan board at 1megabit per second. A dual ISDN only provides 128Kbps and presently cannot be operated mobile.

I'm sure you could make the same statement about the majority of amateur radio... that is I can operate 'DX' far cheaper by calling someone on the phone, I can use the 'autopatch' far cheaper by purchasing a cell phone etc. However, in the case of wireless Internet access, a case can be made that wireless is cheaper in certain instances. In particular third world countries. Don't believe me, ask Dewayne about that.

>  
>If ham operators manage to beat the access speeds to most Internet  
>providers, it won't be for long. ADSL and other technologies can put  
>radio capacity to shame. Face it, we don't have a prayer of matching  
>the reliability and bandwidth of landline communications.

Radio does have advantages in certain applications however.

>>  
>>In other words, we should stop trying to sell ice cubes to  
>>Eskimos.  
>  
>Jeff, what do you envision for the future of Amateur (ham) Radio? A  
>computer hobbyist's network? For what? So they can send radio mail  
>in addition to e-mail? So they can post messages to HamNet like we do  
>in USENET? So they can send a JPEG coast to coast only a few orders  
>of magnitude slower than the far less expensive Internet?

I'm not going to get drawn into a "the Internet is not ham radio" argument when that is not even what I was discussing. I'll discuss one possible future of amateur radio later though.

>  
>I have always contended this hobby is about radio. Radio design,  
>radio technology, radio construction, radio installation, radio  
>operation, radio coordination, etc.... Where is the Computer in  
>Amateur Radio?

This is certainly your prerogative, but did you realize this is the spread spectrum mailing list? Sorry but lots of embedded controllers (computers) running around here. You also might want

to take a look at modern HF radios and the advantage of DSP in them. Soon (or already) you'll find your modern radio is more computer than radio.

>There is only one reason our hobby still exists: We train the next generation of scientists, engineers, technicians, and yes, technology managers, about the state of the art of radio. In that light, spread spectrum is just another facet of radio.

Spread spectrum IS the future of radio.

>We have a training ground.  
>Speed and utility are not the issues. They never were; and chances are they never will be allowed to become one, either. Hopefully, we're doing all this because we want to learn about radio --not because we're trying to build Internet II.

Your arguments are not borne out historically. The ARRL was formed to help relay messages across the country more quickly. Speed and utility are paramount. "Internet II", as you put it, is simply a application some amateurs might want to participate in. You don't have to. I don't have to work DX, talk on repeaters, or any other multitude of interests that is amateur radio. Its called choice.

>  
>This hobby will never grow much beyond impracticality. It was never supposed to. It's nice to see that you have managed to find some utility in your learning efforts. But the hobby as a whole will never be more than a testing or a learning ground. The day it does, is the day you'll call it something else: A Job.  
>  
>73,  
>Jake Brodsky, mailto:frussle@erols.com  
>"Nearly fifty percent of all graduates came from  
>the bottom half of the class."

A Job? I love my job. Don't you? I presently design ITS communications systems as well as embedded controller systems. I'd love to see the same thing going on in amateur radio. Amateur radio needs to be vibrant and commercially viable. We need to make friends of the commercial folks, not enemies as we are so inclined to. I'd like to see 4 million new hams operating wireless spread spectrum on the VHF/UHF/Microwave bands. Intelligent computer controlled radios will make accommodating this new load easy.

I hope that your vision of amateur radio doesn't continue or I fear the service will be passed to those that can better make use of the resource. Its no longer the cold war, we have robust cellular (AMPS, IS-95 and PCS) systems, and communications has taken on a whole new meaning to society.

Lets just agree to disagree and leave it at that.

-Jeff

---

## 19. Re: pathloss and DDMA

From: Don Lemke <wb9mjn@wb9mjn.ampr.org>  
Date: Fri, 08 Aug 1997 13:34:52 -0500  
To: ss@tapr.org  
Message-ID: <33EB66CC.4EB7@wb9mjn.ampr.org>  
Rendered body type: text/plain

Hi Glenn,

> I guess our difference is that I am even more pessimistic than you  
> understand. After the last several years, which have certainly had  
> a degree of success in shipping packets around, I am coming to  
> the opinion that the typical amateur location has \*no\* paths  
> which are good enough to support enough information to develop  
> and maintain the necessary h/w and infrastructure.  
> I'll allow the limit of directionality, use the highest gain antenna  
> or any antenna of your choice which you can practically install at  
> an amateur site and try to find a neighbor to work. Period.  
> Yes, there will be a few but for the most part you won't be able  
> to support enough data to make the whole thing float.

This is very true. So how is this changed? I see DDMA-WAN as the answer to it. Not overnight. Not this decade, but eventually.

Some time ago, the president of our local packet club did a search of all the hams in the 60540 zip code (main zip code in my home town - Naperville, IL). The result was quite suprising. The 60540 zip code is an area 4 miles by 2 miles, and there were over 1000 hams. Naperville has 3 other large zip codes as well, all in an area that is 6 by 3 miles. Naperville is about average for the population densities, of the far western Chicago suburbs. Aurora and Bolingbrook to the west and south have more population density. Wheaton/Warrenville and Lisle/Woodridge to the north and east have less population density. There are plenty of hams to do this, IF a good fraction of them participate.

Two-Way VHF is a good example. The first repeaters were put on primarily so that hams could talk while they were in their cars. That 5000 dollar repeater, and 1000 dollar trunk mounted Micor were not cheap back then. But, that did not stop hams from doing it. And it all grew from there. Initially, there were not many repeaters. There was not many users. And most hams would say, that it would not amount to much, because most hams were experience brain fade, from being on HF all night.

So, say somebody puts on an Internet gateway, and a point-to-point , DSSS link to their home qth. Say Path wise, they get lucky. And because of its point-to-point and DSSS nature, its great. I think we ve seen examples of this so far from several SS group participants, already. But this is an econonic dead end. Nobody else can participate, and eventually politics or entropy destroy the arrangement. Politics may make that gateway go away. Entropy may destroy a computer, or radio, before a new one can be funded by the individual.

How is using a DDMA-WAN link different in this situation? The Internet gateway, and home qth site has a chance of being in range of somebody else. That third station can now participate, simply by buying his own gear. No modification is needed to the first two stations. The original stations have no extra point-to-point gear is requirment and no extra cost. The third station can just do it, without causing any problems for the first two stations, or waiting for those stations to be improved.

3 stations have a greater chance of being in range of a forth, than 2. 4 stations have a greater chance of being in range of the next participant than 3 stations. And so on. Just like several hundred repeaters have a bigger chance of having one being in range of EVERY ham in a metropolitan area, than the one original 2 meter repeater did back in 1955. And similarly, its no longer a matter of IF one buys the gear, will he be in range. But what are MY nearest neighbors. Just as now, we buy a 2 meter handheld, and go out and find THE closest repeaters. A group of tens of DDMA-WAN sites , all in a network, has a much greater chance of getting a new gateway, if one goes away. Or maintaining network linkage, if a station moves away, or gets zapped by lightning. Or having the resources to put on a third party site, to get over a nasty hill.

No point-to-point is not workable in a Ham Radio enviornment. But something like DDMA-WAN has a chance. Its both socially, and physically tenable. Indeed, its because its socially tenable, that it becomes physically tenable, for the arbitrary user site. Whereas point-to-point is only tenable if the physics of a particular path work out.

--

73, Don.

AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]  
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu  
Website: <http://www.qth.com/antpanel>

---

## 20. TAPR Server to be down 8/9/97

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Fri, 8 Aug 1997 22:24:44 -0500  
To: "TAPR-BB list mailing" <tapr-bb@tapr.org>,  
"TAPR APRS SIG" <aprssig@tapr.org>,  
"HF SIG list mailing" <hfsig@tapr.org>,  
"NETSIG list mailing" <netsig@tapr.org>,  
"BBS SIG list mailing" <bbssig@tapr.org>,  
" Spread Spectrum " <ss@tapr.org>, " TAPR SYS " <tapr-sys@tapr.org>,

" tapr-tnc "<tapr-tnc@tapr.org>, aprs-fl@tapr.org,  
" tacgps "<tacgps@tapr.org>,  
TAPR Regional Freq <regional\_freq@tapr.org>,  
" TAPR/AMSAT DSP "<dsp@tapr.org>, " DSP-93 Build "<dsp-93@tapr.org>,  
" TPRS Board "<tpsr-board@tapr.org>  
Message-ID: <v03020900b01191cb3c5c@[208.134.134.40]>  
Rendered body type: text/plain

I just received a call informing us that the building location where the TAPR.ORG server is located will be without power tomorrow for most of the day.

We will be shutting down the server between 7am and 8am and don't expect that it will be available until late Saturday evening when power is restored.

Cheers - Greg, WD5IVD

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>  
-----

"Before you become too entranced with gorgeous gadgets  
and mesmerizing video displays, let me remind you that  
information is not knowledge, knowledge is not wisdom,  
and wisdom is not foresight. Each grows out of the other  
and we need them all."  
-Arthur C. Clarke

---

## 21. Re: N6GN's comments

From: john.cummings@juno.com (John A Cummings)  
Date: Fri, 8 Aug 1997 23:38:54 -0500  
To: ss@tapr.org  
Message-ID: <19970808.234551.7030.0.john.cummings@juno.com>  
Rendered body type: text/plain

On Fri, 8 Aug 1997 17:28:00 -0500 (CDT) Matt Ettus <mne@cmu.edu> writes:  
>

>On the other hand, what about completely avoiding the bad paths  
>issue...  
>  
>Why not a satellite based system, a la VSAT. What about a CDMA VSAT  
>system -- it solves the density problem, the bad paths problem, the  
>routing problem, the coverage problem, etc.  
>  
>Obviously its not a cheap/simple alternative in the near term, but we  
>could get some serious throughput with low power and small dishes.  
>

>73  
>Matt Ettus  
>N2MJ1  
>mne@cmu.edu  
>

I agree. I've been thinking about it all day, and I came to the same conclusion. Make everyone's path the same, standardize the dish mounted T/R unit, plan on a readily available 3 meter TVRO cast-off dish, etc. My latest thoughts include everyone have a high bps receiver, while uplink data rate could depend dish size and xmtr power. DirectPC data rates with bigger receive antennas (300-400 Kbps), and lower than DBS transponder power!

To keep this on topic, have the higher rate QSO's spread their bandwidth wider, so that the SS signals arriving at the geosynchronous satellite have a nearly uniform power per MHz. Some sort of arrangement that does not require "master" stations to carry out the slot reservations of a TDMA system, so that we can maintain amateur anarchy.

I remember about ten to thirteen years ago a proposal (by a WD8???) of putting in a amateur radio transponder aboard a commercial C-band satellite, that we'd get a good fit with the existing waveguide using 5.8 GHz uplink and 3.5 GHz downlink with a 10 MHz transponder. I recall something about New Jersey, so would that have been Philco Ford Aerospace, I think (don't know where they've been merged to).

THIS is something that I would join TAPR and AMSAT for, to plan and build



and donate toward!

John A. Cummings  
1502 Railton Road  
Memphis, TN 38111-3802

N4BKN  
john.cummings@juno.com

---

## 22. 1997 DCC Call for Papers (Reminder)

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Mon, 11 Aug 1997 00:00:32 -0500  
To: "TAPR-BB list mailing" <tapr-bb@tapr.org>,  
"HF SIG list mailing" <hfsig@tapr.org>,  
"Spread Spectrum" <ss@tapr.org>  
Message-ID: <v03110704b0144c672205@[208.134.134.40]>  
Rendered body type: text/plain

Call for Papers

1997 ARRL and TAPR Digital Communications Conference  
October 10-12, 1997  
Baltimore, Maryland (minutes from BWI airport)

Web: <http://www.tapr.org/dcc>

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It's that time again! Time to mark your calendar and think about what to publish for the upcoming 16th Annual ARRL and TAPR Digital Communications Conference.

The 1997 ARRL and TAPR Digital Communications Conference will be held October 10-12, 1997 in Baltimore, Maryland. This year's conference location is just minutes away from the BWI (Baltimore/Washington International) Airport.

For full details on the conference see <http://www.tapr.org/dcc> or contact the TAPR office for the DCC information flyer.

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Call for Conference Proceeding Papers

Anyone interested in digital communications is invited to submit a paper for publication in the Conference Proceedings. Presentation at the Conference is not required for publication. If you know of someone who is doing great things with digital communications, be sure to personally tell them about this! Papers are due by August 20th, 1997, and should be submitted to Maty Weinberg, ARRL, 225 Main Street, Newington, CT 06111 or via the Internet to [lweinberg@arrl.org](mailto:lweinberg@arrl.org). Information on paper submission guidelines are available on-line (<http://www.tapr.org/dcc>). Submissions can be e-mailed.

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Contact TAPR to register or for more information on the DCC.

Tucson Amateur Packet Radio, 8987-309 E. Tanque Verde Road #337, Tucson, AZ 85749-9399. Phone: (940) 383-0000. Fax: (940) 566-2544.  
Internet: [tapr@tapr.org](mailto:tapr@tapr.org) <http://www.tapr.org>

-----  
Tucson Amateur Packet Radio  
8987-309 E Tanque Verde Rd #337 \* Tucson, Az \* 85749-9399 \* 940-383-0000  
-----  
e-mail: [tapr@tapr.org](mailto:tapr@tapr.org) ftp: [ftp.tapr.org](ftp://ftp.tapr.org) web: <<http://www.tapr.org/>>  
-----

---

## 23. RE: 1664] 'Ham' data infrastructure (was: pathloss and DDMA)

From: David Dennis <ddennis@physicist.net>  
Date: Tue, 12 Aug 1997 07:56:43 -0500  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <01BCA6F5.67B75E00@dfw73155.gte.net>  
Rendered body type: text/plain

This is about the most well put thing I've read on here in a while.

-----

From: Jeff King[SMTP:[jeff@mich.com](mailto:jeff@mich.com)]

Sent: Friday, August 08, 1997 7:01 AM  
To: ss@tapr.org  
Subject: [SS:1664] 'Ham' data infrastructure (was: pathloss and DDMA)

Glenn, you appear to be selling and/or basing your network plans on the existing 'ham' population. Respectfully, I think this is the basis for long term failure.

When it comes to high speed networking, and in particular SS, most 'hams' don't have "the vision". What is "the vision"? It is the ability not to see spread spectrum as simply a new mode but a completely new paradigm for the usage of the radio spectrum. With the (hoped for) changes in the SS rules, the availability of cheap Part 15 equipment and the no-code tech license, I think the future of amateur SS lies in the computer experimenters.

In other words, we should stop trying to sell ice cubes to Eskimos.

-Jeff King WB8WKA

---

## 24. Prism Chipset

From: Don Hilman <hilman@camosun.bc.ca>  
Date: Wed, 13 Aug 1997 14:42:32 -0700  
To: ss@tapr.org  
Message-ID: <33F22A48.3A73@camosun.bc.ca>  
Rendered body type: text/plain

I have two applications for a medium speed SS application and am not concerned about "homebrewing" a transciever but would rather work with a commercial chipset.

The Harris Prism was discussed here earlier in the year when it was fairly new , with some comments regarding work projects that were going to use it.

1. Has anyone any recent experience with the chipset?
2. What if any protocol issues are there for network software interfaces to the chipset are there or is it a transparent device with link control handled by the devices themselves?
3. Any comments on distance?
4. What VX0 control is used to set base freq?
5. Data rates are indicated to be up to 1Mb..any experience there?

---

## 25. Re: [SS:1673] Prism Chipset

From: Lyle Johnson <lylej@azstarnet.com>  
Date: Wed, 13 Aug 1997 19:25:46 -0700  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19970813192546.0077e010@pop.azstarnet.com>  
Rendered body type: text/plain

At 04:48 PM 8/13/97 -0500, you wrote:  
>I have two applications for a medium speed SS application and am not  
>concerned about "homebrewing" a transciever but would rather work with a  
>commercial chipset.  
>  
>The Harris Prism was discussed here earlier in the year when it was  
>fairly new , with some comments regarding work projects that were  
>going to use it.  
>  
>1. Has anyone any recent experience with the chipset?

We've done testing with the pre-built boards and are near the board layout stage with our own spin.

>2. What if any protocol issues are there for network software interfaces  
>to the chipset are there or is it a transparent device with link control  
>handled by the devices themselves?

No tusre I understand the question. You can use a MAC chip and impleent IEEE 802.11, or not use a MAC chip and implmement whateve ryou want within the limitations of the Harris baseband chip (e.g., number of chips/bit etc.). We're doing the latter since compatibility with 802.11 means nothing to us and things we want to do that 802.11 isn't good for do matter

to us :-)

>3. Any comments on distance?

Out applications are out-of-door.s On flat ground (parking lots, open desert) we reliably got more than 1.5 miles using omni antennas and the default power output level of 50-100 mW. FCC allows another 10 dB on the trnamsitter so the range shold be able to be better if you add a power amp.

>4. What VX0 control is used to set base freq?

Huh? There is a synthesizer in the chipset which runs from a 22 MHz oscillator, so evetrying depends on the 22 MHz oscillator for RF "channel."

>5. Data rates are indicated to be up to 1Mb..any experience there?

Will also do 2 Mb/sec in QPSK. We tested at 1 Mb. DOn't need the speed, but we need filters you can buy and they are all "tuned" for 1 Mb since that is 802.11 and that is the mass market driving parts.

Check out the harris web page and you can download all sorts of data sheets, etc.

Cheers,

Lyle

---

## 26. unsubscribe please

From: chris <chris@newcomb.com>  
Date: Thu, 14 Aug 97 07:42:52 -0400  
To: ss@tapr.org  
Message-ID: 11425224706886@newcomb.com  
Rendered body type: text/plain

[Empty message body]

---

## 27. WaveLAN Performance

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>  
Date: Fri, 15 Aug 1997 04:12:05 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <199708150412.EAA06283@lynx.ve3jf.ampr.org>  
Rendered body type: text/plain

I'm running a pair of WaveLAN cards across the room between two Linux boxen preparatory to trying them over an outdoor link. Both boxes are Pentiums running the 2.0.30 kernel. I've seen other people report ftp throughputs of the order of 180-190 Kbyte/s for WaveLAN, but the best I've been able to get is in the 85-90 Kbyte/s range (for a 1 MB file). This would seem to indicate that my cards are actually running at the 1 Mbps fallback rate instead of 2 Mbps. But then again, maybe not. I've tried different antenna locations and also attenuation in case there are some overload problems at close range, but the throughput is pretty much the same in all cases.

I notice that there were some changes to the WaveLAN driver in the 2.0.30 kernel release - is anyone else using that version with WaveLAN cards, so we can compare notes? Any performance/tuning hints in general? And lastly, has anyone figured out how to interpret the quality numbers which appear in /proc/net/wireless? Here's a sample:

| Inter- sta                 | Quality |       | Discarded packets |
|----------------------------|---------|-------|-------------------|
| face  tus link level noise | nwid    | crypt | misc              |
| eth1: f0                   | 15.     | 17.   | 0. 19 0 0         |

The "level" param seems to indicate signal strength, and "noise" occasionally pops up to 1 or 2, but I haven't seen the "link" param change.

Barry

--

|                             |  |                                 |
|-----------------------------|--|---------------------------------|
| Barry McLarnon VE3JF/VA3TCP |  | Internet: bm@hydra.carleton.ca  |
| Ottawa Amateur Radio Club   |  | AMPRnet: bm@lynx.ve3jf.ampr.org |
| Packet Working Group        |  | Web: http://hydra.carleton.ca   |

---

## 28. Re: [SS:1676] WaveLAN Performance

From: Bernie Doehner <bad@uhf.wireless.net>  
Date: Fri, 15 Aug 1997 08:06:51 -0400 (EDT)  
To: ss@tapr.org

Message-ID: <Pine.BSF.3.95.970815080015.434C-100000@uhf.wdc.net>  
Rendered body type: text/plain

Hi Barry:

> I'm running a pair of WaveLAN cards across the room between two Linux boxen  
> preparatory to trying them over an outdoor link. Both boxes are Pentiums  
> running the 2.0.30 kernel. I've seen other people report ftp throughputs of  
> the order of 180-190 Kbyte/s for WaveLAN, but the best I've been able to get is  
> in the 85-90 Kbyte/s range (for a 1 MB file). This would seem to indicate that  
> my cards are actually running at the 1 Mbps fallback rate instead of 2 Mbps.  
> But then again, maybe not. I've tried different antenna locations and also  
> attenuation in case there are some overload problems at close range, but the  
> throughput is pretty much the same in all cases.

My personal observations have been that it's very CPU dependent (at least with the FreeBSD driver). I have been getting 190 kbytes/sec 486<->386 while others I know with the same driver have been getting in the low 100's (with Pentiums). Also, the 82586 isn't the best in terms of interrupt performance (which I think is why speed decreases with the faster machines - lost interrupts).

Going to win95 clients I have always been getting around 50-70 kbytes/sec max!

> I notice that there were some changes to the WaveLAN driver in the 2.0.30  
> kernel release - is anyone else using that version with WaveLAN cards, so  
> we can compare notes? Any performance/tuning hints in general? And lastly,  
> has anyone figured out how to interpret the quality numbers which appear  
> in /proc/net/wireless? Here's a sample:  
>  
>  
> The "level" param seems to indicate signal strength, and "noise" occasionally  
> pops up to 1 or 2, but I haven't seen the "link" param change.  
>

I tried at one point to add a step attenuator and figure out the scale of the level/noise (seemed to me it could somehow be signal/noise??).. I didn't succeed, too much variance in the signal strengths..

The level/noise parameters should track what you see with PTPDIAG in DOS. And yes, the link parameter doesn't change much.. Need a large change in level to noise to make it change.

I don't have any time now, but do you by any chance have the 2.0.30 wavelan driver diffs? I am curious what was done to the driver.

Thanks/good luck.

Bernie

---

## 29. Re: [SS:1676] WaveLAN Performance

From: Jeff King <jeff@mich.com>  
Date: Fri, 15 Aug 1997 10:03:01 -0400  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19970815100301.038d2b60@mail.mich.com>  
Rendered body type: text/plain

At 11:21 PM 8/14/97 -0500, Barry McLarnon VE3JF wrote:

>I'm running a pair of WaveLAN cards across the room between two Linux boxen  
>preparatory to trying them over an outdoor link. Both boxes are Pentiums  
>running the 2.0.30 kernel. I've seen other people report ftp throughputs of  
>the order of 180-190 Kbyte/s for WaveLAN, but the best I've been able to  
get is  
>in the 85-90 Kbyte/s range (for a 1 MB file). This would seem to indicate  
that  
>my cards are actually running at the 1 Mbps fallback rate instead of 2 Mbps.

Are these the 900mhz or 2.5ghz versions? Best I've gotten using LINUX has been about 75 Kbyte/s. Was using 133 Pentiums with 900mhz Wavelans. I've got a considerable amount of interference so that has been more the issue for me. I'd be interested in knowing how far you are able to go with them and the antenna/height as well.

There is a WaveLan mailing list. Back issues can be found at:

<http://www.cs.tamu.edu/people/mmehta/links/wavelan.txt>

>But then again, maybe not. I've tried different antenna locations and also  
>attenuation in case there are some overload problems at close range, but the  
>throughput is pretty much the same in all cases.  
>  
> Any performance/tuning hints in general?

I've discussed this on the list before, but note there is a DC voltage which appears on the coax connector. This is to switch the diversity antenna. I'd strongly suggest putting some sort of DC block on it. I had a set of them degrade over time due to plating across one of the coax connectors. Putting a DC block in stopped this from occurring again.

>And lastly,  
>has anyone figured out how to interpret the quality numbers which appear  
>in /proc/net/wireless? Here's a sample:  
>

```
>Inter-|sta| Quality          | Discarded packets
> face |tus|link level noise| nwid crypt  misc
> eth1: f0  15. 17.   0.   19   0   0
>
```

>The "level" param seems to indicate signal strength, and "noise" occasionally  
>pops up to 1 or 2, but I haven't seen the "link" param change.

>  
>Barry

Have you checked the source yet? Seems I figured it out at one time but its slipped my mind.  
Regards,

```
-----
| Jeff King      Aero Data Systems |
| jeff@mich.com  P.O. Box 510895   |
| (810)471-1787  Livonia, MI 48151 |
| F(810)471-0279 United States     |
-----
```

---

### 30. Re: [SS:1678] Re: WaveLAN Performance

From: Bernie Doehner <bad@uhf.wireless.net>  
Date: Fri, 15 Aug 1997 12:09:57 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <Pine.BSF.3.95.970815120842.1204D-100000@uhf.wdc.net>  
Rendered body type: text/plain

The FreeBSD units are 900 MHz. units (full height) used in a residential setting for indoor. My win95 clients are PCMCIA wavelans.

Bernie

---

### 31. Re: [SS:1677] Re: WaveLAN Performance

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>  
Date: Fri, 15 Aug 1997 17:59:51 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <199708151759.RAA07091@lynx.ve3jf.ampr.org>  
Rendered body type: text/plain

Bernie Doehner <bad@uhf.wireless.net> wrote:

> My personal observations have been that it's very CPU dependent (at least  
> with the FreeBSD driver). I have been getting 190 kbytes/sec 486->386  
> while others I know with the same driver have been getting in the low  
> 100's (with Pentiums). Also, the 82586 isn't the best in terms of interrupt  
> performance (which I think is why speed decreases with the faster machines  
> - lost interrupts).

Worse performance with pentiums? Seems odd - I haven't seen that with other devices, such as ethernet cards.

> Going to win95 clients I have always been getting around 50-70 kbytes/sec  
> max!

>  
> > I notice that there were some changes to the WaveLAN driver in the 2.0.30  
> > kernel release - is anyone else using that version with WaveLAN cards, so  
> > we can compare notes? Any performance/tuning hints in general? And lastly,  
> > has anyone figured out how to interpret the quality numbers which appear  
> > in /proc/net/wireless? Here's a sample:  
> >  
> >

> > The "level" param seems to indicate signal strength, and "noise" occasionally  
> > pops up to 1 or 2, but I haven't seen the "link" param change.

|                           |              |  |           |                                                                    |
|---------------------------|--------------|--|-----------|--------------------------------------------------------------------|
| Barry McLarnon            | VE3JF/VA3TCP |  | Internet: | <a href="mailto:bm@hydra.carleton.ca">bm@hydra.carleton.ca</a>     |
| Ottawa Amateur Radio Club |              |  | AMPRnet:  | <a href="mailto:bm@lynx.ve3jf.ampr.org">bm@lynx.ve3jf.ampr.org</a> |
| Packet Working Group      |              |  | Web:      | <a href="http://hydra.carleton.ca">http://hydra.carleton.ca</a>    |

Visit our site often to find out more about our new Martian Consulate coffee mugs, and upcoming golf shirts and custom embroidered baseball caps!

>>>>>>>>>>>>>>> -o0o- <<<<<<<<<<<<<<<

DO NOT SEND ANYMORE JUNK MAIL. UNSOLICITED ADDS AUTOMATICALLY PUT YOUR COMPANY INTO THE "NEVER DO BUSINESS WITH THESE GUYS" FILE



### 38. Re: Recommended convolutional coding books?

From: mdf@angoss.com (Matthew Francey)  
Date: Wed, 27 Aug 1997 21:35:18 GMT  
To: ss@tapr.org  
Message-ID: <199708272135.VAA24995@hydrogen>  
Rendered body type: text/plain

"Digital Modulation and Coding", by Stephen Wilson. It can be heavy going at times though...

---

### 39. for rankings of EE

From: HONG-ZH\_ZHOU@Non-HP-China-om1.om.hp.com  
Date: Thu, 28 Aug 97 09:07:36 +0800  
To: ss@tapr.org  
Cc: W-cdma@usa.net  
Message-ID: <H0000f2006fd5e84@MHS>  
Rendered body type: text/plain

Hi,

I wonder if somebody can provide the latest rankings of University of Electrical Engineering in USA and Britain. And I want to know the university, Research institute or company that research in SS, especially in Wideband CDMA.

Thanks  
Zhou Hong  
w-cdma@usa.net  
8/28/1997

---

### 40. Re: [SS:1686] Recommended convolutional coding books?

From: Bruno Haineault <bhaineau@cts.com>  
Date: Wed, 27 Aug 1997 20:03:27 -0800  
To: ss@tapr.org  
Message-ID: <3404EA7F.D0E3905E@cts.com>  
Rendered body type: text/plain

Try TAPR's "Wireless Digital Communications Design and Theory". It's a great "introduction" to coding.  
There are many other books around (and seeing your postal address, I wonder why the ARRL doesn't offer any).

73 from Bruno, VE2EQ/W6  
San Marcos, California

Jon Bloom wrote:

>

> I'd like to get smarter (which won't take much) about coding. I noticed  
> in the latest Computer Literacy Bookstores bulletin a book,  
> "Convolutional Coding: Fundamentals and Applications," by L.H. Charles  
> Lee. Before I spend \$95 on that, I thought I'd ask if anyone can  
> recommend either that book or a more suitable one. TIA.

>

> Jon

> --

> Jon Bloom, KE3Z | jbbloom@arrl.org  
> American Radio Relay League |  
> 225 Main St., Newington CT 06111 |

[Attachment: smime.p7s; application/x-pkcs7-signature; 4,427 bytes]

---

### 41. Recommendations on coding books - FEC Intro URL

From: Bernie Doehner <bad@uhf.wireless.net>  
Date: Thu, 28 Aug 1997 01:00:28 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <Pine.BSF.3.95.970828005835.15770D-100000@uhf.wdc.net>  
Rendered body type: text/plain

Also, you might enjoy the following URL, which I wrote as a very basic introduction to FEC for one of my grad classes:

<http://bugs.wpi.edu:8080/EE535/hwk97/hwk4cd97/bad/bad.html>

73

Bernie nuls

---

### 42. Re: [SS:1689] Re: Recommended convolutional coding books?

From: Phil Karn <karn@qualcomm.com>  
Date: Wed, 27 Aug 1997 23:35:25 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <199708280635.XAA26146@servo.qualcomm.com>  
Rendered body type: text/plain

Well, there's also my Viterbi and Fano software on my web page, which you can tear apart and figure out. I've always found that doing this with other people's code is a good way to learn how something works...

Phil

---

#### 43. RE: [SS:1689] Re: Recommended convolutional coding books?

From: Jon Bloom <jbloom@arrl.org>  
Date: Thu, 28 Aug 1997 08:01:48 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <XFMail.970828080148.jbloom@arrl.org>  
Rendered body type: text/plain

On 28-Aug-97 Bruno Haineault wrote:

>Try TAPR's "Wireless Digital Communications Design and Theory". It's a  
>great "introduction" to coding.

I've seen that, and it provides a good overview of the subject. I'm looking for a more mathematical treatment, though.

>There are many other books around (and seeing your postal address, I  
>wonder why the ARRL doesn't offer any).

I think you answered your own question.

Jon

---

Jon Bloom, KE3Z  
jbloom@arrl.org

---

#### 44. RE: [SS:1691] Re: Recommended convolutional coding books?

From: Jon Bloom <jbloom@arrl.org>  
Date: Thu, 28 Aug 1997 08:03:37 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <XFMail.970828080337.jbloom@arrl.org>  
Rendered body type: text/plain

On 28-Aug-97 Phil Karn wrote:

>Well, there's also my Viterbi and Fano software on my web page, which you  
>can tear apart and figure out. I've always found that doing this with  
>other people's code is a good way to learn how something works...

I'll probably do that at some point, but right now I want to better understand the theory of it.

Jon

---

Jon Bloom, KE3Z  
jbloom@arrl.org

---

#### 45. Re: [SS:1691] Re: Recommended convolutional coding books?

From: RLANIER@mailb.harris.com (RLANIER)  
Date: Thu, 28 Aug 1997 12:49:36 -0400  
To: ss@tapr.org  
Message-ID: <405abe00@mailb.harris.com>  
Rendered body type: text/plain

As long as what you are tearing apart actually works!!! :)

---

Reply Separator

Subject: [SS:1691] Re: Recommended convolutional coding books?  
Author: ss@tapr.org at smtp  
Date: 8/28/97 1:37 AM

Well, there's also my Viterbi and Fano software on my web page, which you can tear apart and figure out. I've always found that doing this with other people's code is a good way to learn how something works...

Phil

## September 1997

Original source file: ss.9709

Source: [http://ftp.tapr.org/tapr\\_history/SIG\\_Archives/spread-spectrum-sig/mail\\_archive/ss.9709](http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9709)

## 1. WaveLan driver update

From: Jeff King <jeff@mich.com>  
Date: Mon, 01 Sep 1997 14:17:47 -0400  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19970901141747.008ff5c0@mail.mich.com>  
Rendered body type: text/plain

Just saw this on the WaveLan mailing list. Haven't tried it, not sure if its just PCMCIA or will also work with the ISA boards.

-Jeff

-----

Guys,

To everyone interested, the WaveLAN roaming driver for Linux i've been working on is now available. It can be downloaded from:  
<http://www.comp.lancs.ac.uk/computing/staff/joe/wavelan>

It is a patch against pcmcia-cs-2.9.6, and should work on any kernel revision (tested on 2.1.36 & 2.0.30).

I've spoken to Jean Tourrilhes, and we're hoping to merge the patch into the standard PCMCIA wavelan driver soon, but in the meantime...

Feel free to mail me any comments or bug reports.

Thanks,

Joe

Joe Finney e-mail: [joe@comp.lancs.ac.uk](mailto:joe@comp.lancs.ac.uk)  
Rm C9 Computing Dept, tel: (+44) (0)1524 65201 ext. 4676  
SECAMS (+44) (0)1524 752368 evenings.  
Lancaster University (+44) (0)966 198812 mobile.  
Lancaster, fax: (+44) (0)1524 593608  
UK. www: [http://www.comp.lancs.ac.uk/  
computing/staff/joe](http://www.comp.lancs.ac.uk/computing/staff/joe)

LA1 4YW

Regards,

|                |                   |
|----------------|-------------------|
| Jeff King      | Aero Data Systems |
| jeff@mich.com  | P.O. Box 510895   |
| (810)471-1787  | Livonia, MI 48151 |
| F(810)471-0279 | United States     |

## 2. Feeding the modem

From: "Louis Cobet" <Louis\_Cobet@classic.msn.com>  
Date: Mon, 1 Sep 97 23:16:26 UT  
To: ss@tapr.org  
Message-ID: <UPMAIL14.199709012321180315@classic.msn.com>  
Rendered body type: text/plain

I'm new to this list. I got interested because of the President's corner in the summer TAPR PSR.

I have some questions and some observations. Has much thought been given to what the 256 Kbps modem will be fed by. My understanding is that the serial ports on most IBM PC type computers max out at 115 Kbps. I'm not sure about the Ottawa PI2 card. Which then takes us to the various bus and network systems, i.e. Ethernet, USB, "Firewire"(IEEE 1394). Chipsets exist for all of these. Ethernet is well established and will probably be supported indefinitely. The modem could be an Ethernet peripheral like some printers. The success of USB or IEEE 1394 will be determined by the market. IEEE 1394 is being pushed by TI and maybe they would provide some support.

Next is the question of what network protocol do we recommend. Personally, I think TCP/IP is the only way to fly.

Anyway, these are some of the questions I'm thinking about.

Louis Cobet, K6MDH

---

### 3. Re: [SS:1696] Feeding the modem

From: Jim Jefferson <cjeffers@luminet.net>  
Date: Mon, 01 Sep 1997 20:14:09 -0500  
To: ss@tapr.org  
Message-ID: <1.5.4.32.19970902011409.006b4844@luminet.net>  
Rendered body type: text/plain

>I have some questions and some observations. Has much thought been given to  
>what the 256 Kbps modem will be fed by. My understanding is that the serial  
>ports on most IBM PC type computers max out at 115 Kbps. I'm not sure about  
>the Ottawa PI2 card. Which then takes us to the various bus and network  
>systems, i.e. Ethernet, USB, "Firewire"(IEEE 1394). Chipsets exist for all of  
>these. Ethernet is well established and will probably be supported  
>indefinitely. The modem could be an Ethernet peripheral like some printers.  
>The success of USB or IEEE 1394 will be determined by the market. IEEE 1394 is  
>being pushed by TI and maybe they would provide some support.  
>  
>Next is the question of what network protocol do we recommend. Personally, I  
>think TCP/IP is the only way to fly.

Louis, you may want to check back through the archives and see what has been discussed. I like the idea of USB if adapters are available for older computers...

-Jim Jefferson KB0THN  
cjeffers@luminet.net  
<http://www.luminet.net/~cjeffers/>

---

### 4. RE: 1697] Re: Feeding the modem

From: "Louis Cobet" <Louis\_Cobet@classic.msn.com>  
Date: Tue, 2 Sep 97 04:14:30 UT  
To: ss@tapr.org  
Message-ID: <UPMAIL14.199709020416300701@classic.msn.com>  
Rendered body type: text/plain

Jim Jefferson KB0THN wrote  
>Louis, you may want to check back through the archives and see what >has been  
>discussed. I like the idea of USB if adapters are available for older  
>computers...

Thanks. I had looked at the August mail archive and did not see anything about what the thinking was. I'll do more checking.

Louis Cobet, K6MDH  
Louis\_Cobet@msn.com

---

### 5. Re: Feeding the modem

From: Thomas Sailer <sailer@ife.ee.ethz.ch>  
Date: Tue, 02 Sep 1997 11:25:38 +0200  
To: ss@tapr.org  
Message-ID: <340BDB92.367C@ife.ee.ethz.ch>  
Rendered body type: text/plain

Louis,

there is some work going on with the EPP printer port. We've successfully demonstrated 76k8 with our EPP adapter, and it can be used at 256kbps as well.

I agree with you that USB, FireWire or even Ethernet would be a more elegant solution (with ethernet you'd have the flow control problem, though), but EPP might be cheaper :-)

> being pushed by TI and maybe they would provide some support.

I've personally made some bad experiences with TI support. But maybe you've more luck...

> Next is the question of what network protocol do we recommend. Personally, I  
> think TCP/IP is the only way to fly.

As long as you don't get the packet loss rate several orders of a magnitude lower (!!) than current packet links, you definitely need a protocol below IP that resends lost packets only over a single radio link. TCP cannot distinguish lost packets due to QRM and lost packets due to congestion; if a packet gets lost, it will assume congestion and throttle its transmission rate; therefore, significant packet loss rates will severely limit tcp throughput.

73s  
Tom, HB9JNX/AE4WA

---

## 6. Re: [SS:1696] Feeding the modem

From: Mike <zeus@myth.demon.co.uk>  
Date: Tue, 02 Sep 1997 14:17:43 +0100  
To: ss@tapr.org  
Message-ID: <340C11F7.1A7A@myth.demon.co.uk>  
Rendered body type: text/plain

> I have some questions and some observations. Has much thought been given to  
> what the 256 Kbps modem will be fed by. My understanding is that the serial  
> ports on most IBM PC type computers max out at 115 Kbps. I'm not sure about  
> the Ottawa PI2 card. Which then takes us to the various bus and network  
> systems, i.e. Ethernet, USB, "Firewire"(IEEE 1394).

Haven't we been here before? Don't forget the possibility of connecting directly to the PC's ISA/PCI bus. Very useful for hardware development too. I do see ISA ethernet cards going for less than the price of a serial cable though.

Mike

---

## 7. pathloss, responses and summary (long)

From: Glenn Elmore <ge@hpsadr2.sr.hp.com>  
Date: Wed, 3 Sep 1997 10:19:36 -0800 (PDT)  
To: ss@tapr.org  
Message-ID: <199709031719.AA135977178@hpsadr2.sr.hp.com>  
Rendered body type: text/plain

TAPR SS group, 3 September, 1997

I apologize in advance for the length of this but since I'm responding to several different issues and people, all revolving around a central issue or two, it seems important to include as much as I have.

First of all, thank's to all who shared their thoughts! I really do appreciate them and they have been helpful to me in sorting out where things are and what to do next. I recognize that I've personally been trying to figure out what to do next and they have helped me.

Included in this tome are comments (and my repsonses) from,

Don Lemke: about DDMA:  
Jake Brodsky: about 10X56 kbps performance  
Jeff King: again, about 10X56kbps  
Jake Brodsky: replied to Jeff  
Matt Ettus: about satellites,  
Jeff King: on what AR is and where it's going  
Don Lemke: about DDMA:  
John A. Cummings: about TVRO-like satellites

My sumary: what next

#-----  
#-----  
Don Lemke <wb9mjn@wb9mjn.ampr.org> wrote:

# But Glenn, was the N corrected for in the EME anecdote that u  
#related? I m not relying on a 6 dB less path loss. I am relying on a 20  
#dB between nearest neighbors, and the next reuse (grazing).

and

# DDMA-WAN is versatile point to point, Glenn. U simply do not use  
#bad paths. The antenna points to paths that work. The problem with "Hub  
#Master" is that the antennas are fixed, and the enviornment is variable,  
#within the time constant of the enviornment.

Considering that the EME situation was on 2M, I suspect that beamwidths were pretty large and terrestrial radiation was present with the moon

anywhere near the horizon, whether or not a potential image moon was possible.

My problem with your scenario is precisely the 20 dB excess loss number you are using. I don't think amateurs can come up with paths, on average, that are anywhere near that good. DDMA would be fine if there was a diversity of paths to choose among. I'm saying that on average I don't think there is even a single path! The only paths that exist are insufficient to support the required data rate.

Hubmaster, per se, was a protocol not a set of hardware. However in using the associated hardware I originally built for it I kept complete freedom to use all the antenna directivity that was practical and to point in \*any\* direction that served. As such, I always sought the best path that existed. I \*had\* directivity and diversity. DDMA can do no better.

The fundamental problem is that for high information content (assuming that is essential, I'll touch on that later) we increasingly need good paths and short paths.

One thing about your model that does offer hope is that it allows growing a user base outward rather than trying to cover it all from the beginning. If new users are within very short range of the existing boundary it is possible that very short paths might be the rule and enough signal could be recovered to support higher information content. Due to the sparsity of interested and motivated amateurs this probably only fits with adding non-amateurs into the scenario in order to keep path lengths short enough. The problem with this model is that it is no longer radio and the motivations of the necessary members of the shared resource no longer promote amateur radio. It sounds like Part 15 and necessarily commercial.

# BTW, allot of 904 multipath can be done away with Panel antennas.  
#This is how GSM even has a chance of working, with a 230 KB/s data rate,  
#and that lousy .3 GMSK modulation!

I suspect that many of the antennas I've used have even more directivity than your panel antennas, I certainly tried for all the gain that was practical. I would maintain that the reason GSM works is more due to the fact that one end of each link is always very well situated. This is worth many tens of dB compared to a link with each end located as a typical amateur user is.

# With DDMA-WAN , you use the shotgun approach, rather than the  
#commercial point to point approach, of site selection. Everybody gets a  
#DDMA-WAN radio/antenna, and the  
#things figure out what paths work, on their own. Then if there is a

And based on my experience, I find that that approach is insufficient to provide paths which will support the required information rate and applications. If we can find a way to use only nano-cells, paths in the few hundred to one thousand meter catagory, then perhaps things could work. I don't think it will work as amateur radio is currently defined.

#-----

frussle@erols.com (Jake Brodsky) wrote (about 10X56 kbps performance)

#True, but do we really need this kind of performance? Is this what  
#Ham Radio is all about?  
#

#No offense Glenn, but maybe your expectations are too high. Ham radio  
#has never been about throughput. In fact, it's just the opposite:  
#Ever since the hobby began, throughput and usefulness have  
#deliberately been limited so that we don't step on any of the big  
#common carrier interests. =20

#  
#What we're about is training, study, experimentation, and (most of  
#all) having fun. Practicality, dependability, and capacity are nearly  
#undesirable features if they become commonplace. Did you think SSTV  
#was ever supposed to be practical? What good has amateur RTTY ever  
#been to the public as a whole? EME? =20  
#

#Ham Radio was never intended to be a substantial subnet for telegrams,  
#telephony, or the Internet. True, we probably won't be able to match  
#the bandwidth, the reliability, or the availability of commercial  
#services. We'll never even get close. =20

#  
#Spread Spectrum communications should be about developing medium to  
#slow speed (<100 kbps), long haul, autonomous radio station gear. We  
#should be developing adaptable radio gear so that we can brag about  
#how little we used to get across very lossy paths. In this respect,  
#bandwidth and power use should be adjustable so that we can work the  
#longest path.  
#  
#Our services to the public in an emergency capacity has always been a  
#function of our independence of a network. When disaster or war  
#destroys common carrier networks, we become a useful medium of  
#communication by virtue of our numbers, our independence of those  
#networks, and technical knowledge/simplicity. Using those features we  
#hams can communicate long after most public common carriers cease  
#functioning.  
#  
#That's what our hobby is about. I make my living building big,  
#expensive, and reliable communications networks. Why would anyone do  
#this for free?

Jake,

I appreciate your point of view. In fact, I hope it is correct since this is the only model I can believe that can continue to be supported by amateur radio as we know it. Maybe my expectations \*are\* too high.

My fear is that we really are in the "Information Age" and that information capacity is crucial to amateur radio's relevance to its age and therefore to its existence. Perhaps this isn't the case. If AR is supportable by individual experimentation alone and apart from any wide area (shared) ability to handle information, then maybe we should all just be working to make long haul HF work better. Perhaps the hobby can survive as a 'playground for individuals' without any shared network or large information handling capability.

I'm not personally too interested in this at the moment but my interest certainly isn't required.

I confess to being pretty much out of the mainstream as far as judging what is "fun" for hams and potential hams to do. This is a key question.

#-----

Jeff King <jeff@mich.com> wrote (again, about 10X56kbps):

#I believe Glenn is talking about a decent data network. I'd say this  
#is a minimum requirement. At this point I'm only doing 115kbps on  
#a daily basis on amateur radio (STA) and am interested in going faster  
#shortly.

#

#

#This is the problem with "ham radio". I'm a AMATEUR RADIO operator and  
#I don't have any preconceptions of what I am capable of doing. I just  
#go do it. I've not been a 'ham' for at least 10 years although I use  
#my amateur license on a daily basis. If you want to operate 150baud  
#rtty then have at it. Just don't try to stop me from my 'high' throughput  
#experimentation/operations.

at the level of a single link or two, I think you're in good shape. But if a wide area information infrastructure is required, I think the physics of the real world is going to say something about what you can and can't do.

#No-one should give their labor for free. This amazes me many times that  
#so many are willing to short change themselves in this regard. I see  
#a sizable market in high speed amateur radio if it could only be  
#marketed to the right people. Most of these people aren't in the  
#amateur service right now. And that brings me to my point.

#

#Glenn, you appear to be selling and/or basing your network plans  
#on the existing 'ham' population. Respectfully, I think this is the  
#basis for long term failure. While things may be different were you  
#live, when I have done SS presentations to 'ham' clubs, I would  
#generally get glazed over stares from most of the 'hams'. A few would  
#say they are interested in operating this new 'mode'. One amateur might  
#get "the vision". The rest of the 'hams' were interested in getting  
#onto contesting or what 'bad ham' is doing on the repeater. When  
#I would do similar demonstrations at computer clubs a significant  
#portion of the group could see what SS could do for them. I would

#be surrounded after the meeting by people asking in depth questions.

I think you are probably correct that the existing 'radio' population won't support a high information content network over a wide area. However, my experience is that the motivation of those who might appreciate such a thing has little to do with 'radio'. Part 15 is probably a better fit for them.

#In other words, we should stop trying to sell ice cubes to  
#Eskimos.

You could be right. But I personally like to play in radio and I'm afraid that those who would buy in to supporting a radio network would likely drop it as soon as something better (like fiber to the door) came along. Maybe this is just the way it is and radio has had its day in the sun.

When n6rce, n6plo and I originally wrote the Hubmaster paper and I built the (then) 512 kbps radio hardware, we tried to develop s/w on a readily available platform and attract non-amateurs as well as amateurs in Silicon Valley. At the same time that we presented papers at the ARRL Networking Conference, n6rce and n6tto published a parallel article in Dr. Dobb's Journal with an amateur radio sidebar.

The attempt was not particularly well received. The 'computer types' responding generally wanted only to be able to bypass slower phone lines and the difficulties in solving antenna/path problems in practical living situations were too much for them. They might have subscribed to a wireless-ISP to provide their connectivity desires but radio really was peripheral to their desires and interests.

Jake Brodsky, replied along these lines:

#-----  
#I have always contended this hobby is about radio. Radio design,  
#radio technology, radio construction, radio installation, radio  
#operation, radio coordination, etc.... Where is the Computer in  
#Amateur Radio? Sure you can use one with a radio. I can also fly an  
#airplane with a radio. I can use a video camera with a radio (an ATV  
#transmitter for sending video). That doesn't mean I market the hobby  
#to aviators or TV fanatics.  
#  
#There is only one reason our hobby still exists: We train the next  
#generation of scientists, engineers, technicians, and yes, technology  
#managers, about the state of the art of radio. In that light, spread  
#spectrum is just another facet of radio. We have a training ground.  
#Speed and utility are not the issues. They never were; and chances  
#are they never will be allowed to become one, either. Hopefully,  
#we're doing all this because we want to learn about radio --not  
#because we're trying to build Internet II. =20  
#  
#This hobby will never grow much beyond impracticality. It was never  
#supposed to. It's nice to see that you have managed to find some  
#utility in your learning efforts. But the hobby as a whole will never  
#be more than a testing or a learning ground. The day it does, is the  
#day you'll call it something else: A Job.

I'm wondering if the training AR provides will continue to be interesting and relevant enough within the current (information) context to keep supporting what you label as the hobby's only reason for existence. I hope it can but I really don't know that I believe it will.

If AR's association with radio no longer serves as a vehicle to train, relative to the need in society, then I fear it has lost what you say is its sole means of support.

#-----

Matt Ettus <mne@cmu.edu> wrote:

#Your comments on the lack of sufficient density of seriously interested  
#ham is quite true. When we can't even convince people to use TCP/IP  
#instead of NetROM or ROSE or even nothing at all...  
#  
#On the other hand, what about completely avoiding the bad paths issue...



```
#
#Why not a satellite based system, a la VSAT. What about a CDMA VSAT
#system -- it solves the density problem, the bad paths problem, the
#routing problem, the coverage problem, etc.
#
#Obviously its not a cheap/simple alternative in the near term, but we
#could get some serious throughput with low power and small dishes.
#Maybe 10Ghz Uplink, 24 GHz down. Thats 800Mhz of pretty much unused
#spectrum. No interference problems either...
```

I've looked at the physics of this too. While I find it to generally satisfy the need for good paths, it doesn't satisfy the need for short paths. Short paths are needed for two reasons,

- (1) to reduce the loss and excess loss to an acceptable value
- (2) to keep the number of users sharing a link small.

Satellites fail at the second point. To see that this is the case, make some simple calculations of the power density at the surface that a geostationary satellite or even a satellite from a fleet of LEO satellites can provide.

You might be able to spread, say, 100 watts over the continental US. Now make an assumption about how much of this power a user's antenna can catch, say  $1 \text{ M}^2$ . Next apply Shannon and see what data rate that will support. Even Iridium, with it's 65? satellites doesn't cut it. If it weren't for the wireline and terrestrial information pipes that subsidize the paltry nomadic satellite side, it wouldn't have a chance. (I'm not sure that it does anyway.)

As an example, TVRO gives significant bandwidth but it's not shared, everyone sees the same information. You have to carve it up among 50K (or whatever) supporters/users and see what's left. Per Shannon, a typical raw C band TVRO transponder can do as much as 100 Mbps but divided up 50K ways it is only 2 kbps/user. I don't think we can get 50K hams to dedicate a 3 meter dish in their yards either and certainly not for that kind of performance.

Adding satellites and shortening the paths, as Iridium does, helps things somewhat but is extremely expensive. We eventually want a system approaching the capacity of 1 satellite/user, something that is not currently affordable for anyone, amateur or commercial!

```
#
#-----
```

In the debate on what AR is and where it's going  
Jeff King WB8WKAJ wrote:

```
#Spread spectrum _IS_ the future of radio.
#
```

While I am interested in applying the benefits of SS to AR, I think this is a bit of an overstatement. I think that at its best, SS is a way to more efficiently transfer information over real-world paths and perhaps to a small degree, facilitate sharing of resources among multiple users.

```
#>utility in your learning efforts. But the hobby as a whole will never
#>be more than a testing or a learning ground. The day it does, is the
#>day you'll call it something else: A Job.
```

```
#>
#>73,
#>Jake Brodsky, mailto:frussle@erols.com
#>"Nearly fifty percent of all graduates came from
#>the bottom half of the class."
```

```
#
#A Job? I love my job. Don't you? I presently design ITS communications
#systems as well as embedded controller systems. I'd love to see the
#same thing going on in amateur radio. Amateur
#radio needs to be vibrant and commercially viable. We need to make
#friends of the commercial folks, not enemies as we are so inclined to.
#I'd like to see 4 million new hams operating wireless spread spectrum on
#the VHF/UHF/Microwave bands. Intelligent computer controlled radios will
#make accommodating this new load easy.
```

```
#
#I hope that your vision of amateur radio doesn't continue or I fear the
#service will be passed to those that can better make use of the resource.
#Its no longer the cold war, we have robust cellular (AMPS, IS-95 and PCS)
#systems, and communications has taken on a whole new meaning to society.
```

```

#
#Lets just agree to disagree and leave it at that.
#
#-Jeff
#
#-----

Don Lemke:
#
#   This is very true. So how is this changed? I see DDMA-WAN as the
#answer to it. Not overnight. Not this decade, but eventually.
#
#   Some time ago, the president of our local packet club did a search
#of all the hams in the 60540 zip code (main zip code in my home town -
#Naperville, IL). The result was quite suprising. The 60540 zip code is
#an area 4 miles by 2 miles, and there were over 1000 hams. Naperville
#has 3 other large zip codes as well, all in an area that is 6 by 3
#miles. Naperville is about average for the population densities, of the
#far western Chicago suburbs. Aurora and Bolingbrook to the west and
#south have more population density. Wheaton/Warrenville and
#Lisle/Woodridge to the north and east have less population density.
#There are plenty of hams to do this, IF a good fraction of them
#participate.

Thanks for including the numbers, it is indeed surprising how many
license holders there are 'lurking' about (:>) A search here in Northern
California reveals a similar situation.

The problem I see is in the last line; getting a good fraction to
actually participate in a resource-sharing AR(radio)-promoting manner.
Of those 1000 hams, how many are interested enough in the *radio* side
of things, paths, RF hardware and propagation enough to pursue it? If
your situation is like ours here, it is a very very small percentage.
The mean path length between this subset and the path quality between
them is not sufficient for a highspeed network.

Building a network which includes the 'non-RF-interested' is the only
possibility that I see.

#
#   Two-Way VHF is a good example. The first repeaters were put on
#primarily so that hams could talk while they were in their cars. That
#5000 dollar repeater, and 1000 dollar trunk mounted Micor were not cheap
#back then. But, that did not stop hams from doing it. And it all grew
#from there. Initially, there were not many repeaters. There was not many
#users. And most hams would say, that it would not amount to much,
#because most hams were experience brain fade, from being on HF all
#night.
#
#   So, say somebody puts on an Internet gateway, and a point-to-point
#link, DSSS link to their home qth. Say Path wise, they get lucky. And
#because of its point-to-point and DSSS nature, its great. I think we ve
#seen examples of this so far from several SS group participants,
#already. But this is an ecomonic dead end. Nobody else can participate,
#and eventually politics or entropy destroy the arrangement. Politics may
#make that gateway go away. Entropy may destroy a computer, or radio,
#before a new one can be funded by the individual.
#
#   How is using a DDMA-WAN link different in this situation? The
#Internet gateway, and home qth site has a chance of being in range of
#somebody else. That third station can now participate, simply by buying
#his own gear. No modification is needed to the first two stations. The
#original stations have no extra point-to-point gear is requirment and no
#extra cost. The third station can just do it, without causing any
#problems for the first two stations, or waiting for those stations to be
#improved.

It's at this last point that I have difficulty believing the scenario.
In order for a new, third station to want to participate he has to be
motivated. I think we both have already established that we don't think
that "RF-geekness" is widespread enough to allow the potential new user
membership. His motivation has to be 'something interesting unavailable
elsewhere or for markedly less cost'.

```

In addition, each existing user has to make sure his h/w is there reliably enough to support the potential new user(s). It has to be functional full time. The motivations of this new user seem to fit Jeff King's model of who joins. In general, it is not a person interested in

building, supporting and sharing a radio network as much as it is someone who wants something more than existing wireless, phoneline/ISDN networking solutions can provide or for less cost. I suspect that even with free RF hardware, these people would not be willing or able to support such a network with the types of installations and paths that are required in the real world.

# 3 stations have a greater chance of being in range of a forth, than #2. 4 stations have a greater chance of being in range of the next #participant than 3 stations. And so on. Just like several hundred #repeaters have a bigger chance of having one being in range of EVERY ham #in a metropolitan area, than the one original 2 meter repeater did back #in 1955. And similarly, its no longer a matter of IF one buys the gear, #will he be in range. But what are MY nearest neighbors. Just as now, we #buy a 2 meter handheld, and go out and find THE closest repeaters. A #group of tens of DDMA-WAN sites , all in a network, has a much greater #chance of getting a new gateway, if one goes away. Or maintaining #network linkage, if a station moves away, or gets zapped by lightning. #Or having the resources to put on a third party site, to get over a #nasty hill.

I would be interested to see your estimates for the kinds of data rates which are supportable over the types of paths that fit the above description, even using the best choices of antenna pointing and directivity practical.

From my measurements and experience, I don't believe it possible to find the 'critical user density' necessary to produce a single adequate path, much less a choice, which "pays it's own way" from a point of view of delivered user data rate.

# No point-to-point is not workable in a Ham Radio enviornment. But #something like DDMA-WAN has a chance. Its both socially, and physically #tenable. Indeed, its because its socially tenable, that it becomes #physically tenable, for the arbitrary user site. Whereas point-to-point #is only tenable if the physics of a particular path work out.

Maybe I'm missing something fundamental here but I don't see how DDMA can provide a path better than that produced by a directional antenna pointed in the best direction (point-point). The versatility of DDMA can't produce a better path than exists for a fix-pointed antenna.

#-----  
#From: john.cummings@juno.com (John A Cummings)

(responding to Matt's proposal)

#>Why not a satellite based system, a la VSAT. What about a CDMA VSAT

#>

#

#I agree. I've been thinking about it all day, and I came to the same #conclusion. Make everyone's path the same, standardize the dish mounted #T/R unit, plan on a readily available 3 meter TVRO cast-off dish, etc. My #latest thoughts include everyone have a high bps receiver, while uplink #data rate could depend dish size and xmtr power. DirectPC data rates with #bigger receive antennas (300-400 Kbps), and lower than DBS transponder #power!

I think I presented the problem with this approach above. It simply doesn't scale to the large number of users required to support it, a la AMSAT.

#To keep this on topic, have the higher rate QSO's spread their bandwidth #wider, so that the SS signals arriving at the geosynchronous satellite #have a nearly uniform power per MHz. Some sort of arrangement that does #not require "master" stations to carry out the slot reservations of a #TDMA system, so that we can maintain amateur anarchy.

#I remember about ten to thirteen years ago a proposal (by a WD8???) of #putting in a amateur radio transponder aboard a commercial C-band #satellite, that we'd get a good fit with the existing waveguide using 5.8 #GHz uplink and 3.5 GHz downlink with a 10 MHz transponder. I recall #something about New Jersey, so would that have been Philco Ford #Aerospace, I think (don't know where they've been merged to).

#

#THIS is something that I would join TAPR and AMSAT for, to plan and build #and donate toward!

But consider this from the satllite's viewpoint, a large number of users each trying to get 400 kbps through it. Even with the best of sharing

mechanisms, spreading and coding, with typical systems which operate around 10 dB from the Shannon limit, there's only room for about 25 users before the thing goes into congestive collapse! It's 145.01 MHz 1200 bps packet all over again but this time with a lot of angry "supporters" who paid for "their" satellite and can't use it.

#-----  
#-----

My summary:

Again, thanks very much to all of you who responded. Each of you has a valid perspective and I appreciate it.

At this point, while I am still interested in applying SS to amateur hardware, my motivation is far more out of personal curiosity than out of hope that anything I can contribute will help produce a wide area information structure or further the hobby in any general way. Whether or not the hobby can maintain spectrum through supporting this kind of individual activity remains a question to me. I hope that it can since the I've greatly enjoyed amateur radio in my 37 years as a ham.

I'll probably keep poking around with low microwave and microwave RF hardware but I'm finding myself attracted to lightwaves and lasers as an information carrier for both weak signal/narrowband and wideband uses. I'm not sure what to do with 100+ Mbps of bandwidth or an ethernet/laser bridge but maybe I'll think of something. PIC processors seem useful and fun too.

Santarosa.ampr.org is still on full time from the hamshack, running JNOS and serving web pages over the 230 kbps hardware we've been using for the last several years. I have more hardware than interested participants (there are a couple of extra radios on the floor under the bench) and I don't anticipate our local radio network growing much beyond it's present few users.

Please feel welcome to 'drop in' and chat, browse any of the related web pages:

|                                                                                     |              |
|-------------------------------------------------------------------------------------|--------------|
| <a href="http://www.tapr.org/~n6gn">http://www.tapr.org/~n6gn</a>                   | TAPR site    |
| <a href="http://www.santarosa.ampr.org/">http://www.santarosa.ampr.org/</a>         | the hamshack |
| <a href="http://redwood3.ampr.org/index.htm">http://redwood3.ampr.org/index.htm</a> | the gateway  |

I'm around most evenings 0000-0500 UTC

73

Glenn n6gn

---

## 8. Subscribe

From: Jerry Normandin <jerry-normandin@usa.net>  
Date: Wed, 03 Sep 1997 23:28:37 -0400  
To: ss@tapr.org  
Message-ID: <340E2AE5.D84C359C@usa.net>  
Rendered body type: text/plain

[Empty message body]

---

## 9. Re: [SS:1701] pathloss, responses and summary (long)

From: frussle@erols.com (Jake Brodsky)  
Date: Thu, 04 Sep 1997 18:07:52 GMT  
To: ss@tapr.org  
Message-ID: <3411c5d8.7699848@smtp.erols.com>  
Rendered body type: text/plain

I think your summary was good food for thought, Glenn. Spread spectrum technology seems to be the answer. Now, if only we could figure out what the question was...

In one respect, I feel that spread spectrum systems offer us the same sort of situation that FM offered hams in the early 1950's. What modulation index should we use? (What Eb/No should we use?) What pre-emphasis curve should we use? (What kind of error correcting coding should we use?) Should we strive for high fidelity audio? (How fast should we send?) Somehow these questions got solved when the killer application, VHF repeater operations, made itself apparent.

We have yet to find the optimum speed, coding, and spreading

parameters because nobody has yet figured out what this stuff is good for.

Sure the Part 15 stuff is ok for linking small LANs together. But it doesn't scale up very well. People buy wireless FM intercoms too. Could a wireless intercom become a telephone system?

It might serve in the same capacity as a cordless phone, but even a laptop isn't nearly as portable as a telephone receiver. I just don't see the utility of walking around the house with your laptop. The newer IR links are probably a better fit for the "wireless" application.

We could build a wide area network such as cellular telephone networks have, but that requires serious infrastructure, real estate, and money which the ham community is very unlikely to come by.

What does spread spectrum really offer us that FM doesn't? Well, other stations can re-use the same spectrum and the only penalty is a steadily reduced s/n. Under certain conditions, narrow band users and spread spectrum users can coexist. And last, it offers some intriguing possibilities for higher speed communications or weak signal recovery where multiple echoes are unavoidable (such as with EME or other backscatter communications paths).

Unless I've missed something, those are really the only benefits. So what could the ham community do with this technology?

Perhaps we could build a transcode repeater (using orthogonal codes, something like using the same code with PSK in, AM out). In the FM world this might be the equivalent of a replexer (a sort of transverter with a limiter and a COR in the middle) except that here we use code division instead of frequency division. It would enable hams to send data broadcasts across wide areas. The content could be in the form of a IP packet (with some standard compression and FEC algorithms built in).

No, it would never be particularly fast, maybe no faster than 64 kbps, nor particularly useful. But then, how useful are the FM repeaters of today? Perhaps some could offer internet gateways, just as repeaters have autopatches.

On a more offbeat note: these spread spectrum repeaters could serve as phase and frequency standards if a GPS standard clock were at each site. Given three or more transcode repeaters at well known places, one could determine position (the metropolitan ham version of GPS?).

It may even be feasible to put something like this on board a satellite.

I think that's what we should be developing spread spectrum for. It's not nearly as fancy or sexy as a Ricochet (sp?) MAN, but it could be pretty cool too.

Thoughts?

Jake Brodsky, AB3A <mailto:frussle@erols.com>  
"Beware of the massive impossible!"

---

## 10. Re: [SS:1703] Re: pathloss, responses and summary (long)

From: "Alan J. Eynon" <[aeynon@micro.ti.com](mailto:aeynon@micro.ti.com)>  
Date: Thu, 04 Sep 1997 14:54:12 -0500  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <3.0.3.32.19970904145412.006adb28@pcmail.micro.ti.com>  
Rendered body type: text/plain

In reference to Jake's comments:

>What does spread spectrum really offer us that FM doesn't? Well,  
>other stations can re-use the same spectrum and the only penalty is a  
>steadily reduced s/n. Under certain conditions, narrow band users and  
>spread spectrum users can coexist. And last, it offers some  
>intriguing possibilities for higher speed communications or weak  
>signal recovery where multiple echoes are unavoidable (such as with  
>EME or other backscatter communications paths).

It's interesting that you compare SS and FM. Looked at the right way, FM is a form of analog SS, since it also increases signal fidelity by

the use of greater bandwidth (depending on the modulation index). I also want to point out that the assumption is always that SS is a digital form of communication. It needn't be - any more than FM is digital because you can do FSK with it. It may not make any \*sense\* to talk about analog implementations (give, as you pointed out, that everything seems to be tied to a computer these days), but SS itself doesn't have to be digital. In fact, most of the early "noise modulation" systems weren't.

>Unless I've missed something, those are really the only benefits. So  
>what could the ham community do with this technology?

It may be that spread spectrum won't "take off" in the amateur community until that new "killer application" comes along that requires it. My personal interest in SS is to gain experience working with the technology itself, outside of any specific application.

Heck, here in Houston, if I want a SS application I'll call PrimeCo and buy one of their cellular phones. I won't learn much by it, though.

Even after we decide on the system parameters, there's still a ton of implementation details where hams can get ahead of industry. For instance, synchronization is a problem in direct sequence systems, and the magnitude of the problem gets bigger as you use longer and longer spreading sequences. The traditional solution is to brute-force search every possible offset until the sequence in your receiver aligns with the sequence in the transmitted signal (at which point the signal despreads and you can start your QSO). There are methods out there that are more elegant than the brute-force search, but current SS system spreading sequences are short enough that a custom ASIC is able to handle the synchronization. That may not always be the case. If we were to come up with something better, though, it would be completely invisible to the end-user application - does that mean it's not worth investigating?

Oh, sorry, how'd I get up on this soapbox?

>It may even be feasible to put something like this on board a  
>satellite.

Now \*this\* may be a real combination of interests. First of all, you're getting an increasing level of fading protection as the bandwidth increases. Second, you can run this sort of service as an overlay with the narrowband satellite users without either community interfering with the other.

My only caution here is that you don't want to do any spreading/despreading on board the satellite. A nice, wide transponder pipe's all that's needed. Keep all of the SS applications here on earth, so that we can change and upgrade them as our interests change and technology improves.

One other application that might be interesting is HF SS, if the regulators ever allow it. Here's a channel with lots of multipath fading (which SS excels at combating) and not enough bandwidth for all of the narrowband users who want it. An HF SS overlay helps fix both problems.

73,  
Alan  
N3IRL

Software Development Systems, Stafford, Texas Instruments, +1 281-274-2943

-----  
"Now look, this isn't an argument; it's just contradiction." -- Monty Python

---

## 11. Re: [SS:1699] Re: Feeding the modem

From: "Dale Heatherington" <wa4dsy@wa4dsy.radio.org>  
Date: Thu, 04 Sep 97 17:34:13  
To: "ss@tapr.org" <ss@tapr.org>  
Message-ID: <m0x6jXZ-00019hC@wa4mei.radio.org>  
Rendered body type: text/plain

Has anyone tried MkLinux on the Power Mac (or clones) ?

Power Macs have a synchronous serial port capable of around 900 kbps( I think). If MkLinux could do ax25/tcpip on the port the my 56K modem (and others) could be directly connected. Anyone tried this?

-----  
Dale Heatherington, WA4DSY  
e-mail - daheath@ibm.net  
Web page - http://www.wa4dsy.radio.org  
OS/2 Warp 4.0 The worlds finest desktop OS.

---

## 12. Re: [SS:1705] Re: Feeding the modem

From: Steve Dimse K4HG <k4hg@tapr.org>  
Date: Thu, 4 Sep 97 18:10:12 -0000  
To: <ss@tapr.org>  
Message-ID: <199709042209.RAA04733@tapr.org>  
Rendered body type: text/plain

On 9/4/97 9:34 PM Dale Heatherington (wa4dsy@wa4dsy.radio.org) wrote:

>Has anyone tried MkLinux on the Power Mac (or clones) ?  
>  
>Power Macs have a synchronous serial port capable of  
>around 900 kbps( I think). If MkLinux could do ax25/tcpip on  
>the port the my 56K modem (and others) could be directly connected.  
>Anyone tried this?  
>  
This is the Geo-Port, another one of Apple's standards that failed to gain acceptance, it is capable of a bit over 2 Mbits/sec depending on the speed of the processor. However, it depends on software drivers which I believe are not available within Linux. They could be written, but I doubt there would be many users that would need or take advantage of this...

Most current macs have serial ports that reliably do over 200 kbaud, therefore your modem should work with the standard RS-422 connect to the Mac.

However, since most hams don't have Macs, it is not a solution that would help many.

Steve

---

## 13. Re: [SS:1703] Re: pathloss, responses and summary (long)

From: Jeff King <jeff@mich.com>  
Date: Thu, 04 Sep 1997 18:39:55 -0400  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19970904183955.036a5480@mail.mich.com>  
Rendered body type: text/plain

At 01:10 PM 9/4/97 -0500, Jake Brodsky wrote:

>In one respect, I feel that spread spectrum systems offer us the same  
>sort of situation that FM offered hams in the early 1950's.

Actually, I compare it to the situation that presented itself in the early 1920's, that is the move from wide band non-coherent modulation (i.e. spark) to narrow band ASK (CW). FM had been used since the 1930's by amateurs so the move to FM was more of a incremental move, as opposed to a evolutionary move that both the adoption of CW was and spread spectrum will be. Whole new paradigms of spectrum usage evolved from these moves. You might want to read Jones latest PSR editorial as he alludes to some of these things.

Regards,

-----  
| Jeff King        Aero Data Systems |  
| jeff@mich.com   P.O. Box 510895   |  
| (810)471-1787   Livonia, MI 48151 |  
| F(810)471-0279   United States    |  
-----

---

## 14. Re: [SS:1701] pathloss, responses and summary (long)

From: Jeff King <jeff@mich.com>  
Date: Thu, 04 Sep 1997 19:17:40 -0400  
To: ss@tapr.org, Glenn Elmore <ge@hpsadr2.sr.hp.com>  
Message-ID: <3.0.3.32.19970904191740.0389a410@mail.mich.com>

Rendered body type: text/plain

Glenn:

Thanks for your comments. A few points I want to expand/clarify.

At 12:23 PM 9/3/97 -0500, Glenn Elmore wrote:

```
># (Jeff King said):
>#This is the problem with "ham radio". I'm a AMATEUR RADIO operator and
>#I don't have any preconceptions of what I am capable of doing. I just
>#go do it. I've not been a 'ham' for at least 10 years although I use
>#my amateur license on a daily basis. If you want to operate 150baud
>#rtty then have at it. Just don't try to stop me from my 'high' throughput
>#experimentation/operations.
>
>at the level of a single link or two, I think you're in good shape. But
>if a wide area information infrastructure is required, I think the
>physics of the real world is going to say something about what you can
>and can't do.
```

Of course, I was referring to a earlier comment in which it was stated that (and I'm paraphrasing) ham radio wasn't about high speed wireless Internet connections. Good RF practices have to applied to SS as to any other mode. My point was that ham radio is what you make it. Even though I considered baudot RTTY (non error correcting) obsolete, it is not my right to say 'you' can't use it, just as I claim it is not others rights to say I can't use amateur radio a certain (legal though) way.

```
>#-----
>
>In the debate on what AR is and where it's going
>Jeff King WB8WKAJ wrote:
>
>#Spread spectrum _IS_ the future of radio.
>#
>
>While I am interested in applying the benefits of SS to AR, I think this
>is a bit of an overstatement. I think that at its best, SS is a way to
>more efficiently transfer information over real-world paths and perhaps
>to a small degree, facilitate sharing of resources among multiple users.
```

I of course was referring to radio as a whole. You are likely correct if you're speaking of amateur radio whose users are less concerned about maximizing spectrum utilization then staking their frequency claim out. It's really the difference between radio welfare (i.e. amateur radio) and the private sector (paying for the frequencies). If someone hands you multiple billions worth frequency for free, and the other guy has to pay out of his pocket, he will be more concerned about maximizing his use (and re-use) of the spectrum.

```
>#-----
>
>
>My summary:
>
>
> I'll probably keep poking around with low microwave and microwave RF
>hardware but I'm finding myself attracted to lightwaves and lasers as an
>information carrier for both weak signal/narrowband and wideband uses.
>I'm not sure what to do with 100+ Mbps of bandwidth or an ethernet/laser
>bridge but maybe I'll think of something. PIC processors seem useful
>and fun too.
```

That's interesting, been thinking/playing with both (lasers and PICS) lately. One idea I had for lasers was using them in a 'spot' basis, kinda similar to the NASA ACTS satellite. Users would have a low data rate (RF) channel to announce their need of a 'slot' as well as their location. The central laser 'switch' would aim the laser transceiver at the user, via some fast optics (galvo mirrors or something). At that point the user would be in the 'scan' pattern for the switch. Basically token ring. You would of course need an optical line of sight for this to work.

Also been using PICS at work lot (16C77 and 16C621). I'd like to try and adapt a PIC to a frequency hopping controller. You haven't seen any 'C' source code and/or English descriptions on how this might be best accomplished? I'd be interested in doing this.



Regards,

```
-----  
| Jeff King      Aero Data Systems |  
| jeff@mich.com  P.O. Box 510895   |  
| (810)471-1787  Livonia, MI 48151 |  
| F(810)471-0279 United States     |  
-----
```

## 15. Re: [SS:1706] Re: Feeding the modem

From: Mike Murphree <n4cnw@ibm.net>  
Date: Fri, 05 Sep 1997 08:31:15 -0400  
To: k4hg@tapr.org, wa4dsy@wa4dsy.radio.org  
Cc: ss@tapr.org, dkelly@nebula.tbe.com  
Message-ID: <340FFB93.11DB1F42@ibm.net>  
Rendered body type: text/plain

Steve Dimse K4HG wrote:

```
>  
> On 9/4/97 9:34 PM Dale Heatherington (wa4dsy@wa4dsy.radio.org) wrote:  
>  
> >Has anyone tried MkLinux on the Power Mac (or clones) ?  
> >  
> >Power Macs have a synchronous serial port capable of  
> >around 900 kbps( I think). If MkLinux could do ax25/tcpip on  
> >the port the my 56K modem (and others) could be directly connected.  
> >Anyone tried this?
```

I'm not sure about MkLinux, but there is a software package available (with source) called SoftKiss that uses the 85C30 compatible interface to drive a Baycom-style modem directly. It should be relatively easy to change the baud rate by recompiling. There is a version of NET (not NOS) that is still under development that will drive SoftKiss. Check ftp.ucsd.edu for the code...

```
> >  
> > This is the Geo-Port, another one of Apple's standards that failed to  
> > gain acceptance, it is capable of a bit over 2 Mbits/sec depending on  
> > the  
> > speed of the processor. However, it depends on software drivers which  
> > I  
> > believe are not available within Linux. They could be written, but I  
> > doubt there would be many users that would need or take advantage of  
> > this...
```

"Geo-Port", huh?? All Macs since the dawn of Mac-doom have been equipped with LocalTalk ports. The standard rate for the port is 230 kbps and with external clocking is good to at least 1 Mbps.

```
> > Most current macs have serial ports that reliably do over 200 kbaud,  
> > therefore your modem should work with the standard RS-422 connect to  
> > the  
> > Mac.  
> >  
> > However, since most hams don't have Macs, it is not a solution that  
> > would  
> > help many.
```

Ahhhh, but there are lots and lots of old systems out there. The classic Macs can be had for less than \$200 and even 68030 systems (that would run MkLinux) are available for less than \$400. Better yet, every Mac ever made had to pass FCC certification so they are much quieter for radio use. When I can buy an entire computer for less than the price of the interface card to go in your PC, the solution isn't very hard.

73

--

Mike N4CNW n4cnw@ibm.net, n4cnw@amsat.org,  
mike.murphree@boeing.com

"A human being is the best computer available to place  
in a spacecraft.... It is also the only one that can  
be mass produced with unskilled labor."  
-- Werner Von Braun

---

## 16. Re: [SS:1704] Re: pathloss, responses and summary (long)

From: frussle@erols.com (Jake Brodsky)  
Date: Fri, 05 Sep 1997 12:58:23 GMT  
To: ss@tapr.org  
Message-ID: <340ff584.922466@smtp.erols.com>  
Rendered body type: text/plain

On Thu, 4 Sep 1997 14:57:14 -0500 (CDT), Alan, N3IRL wrote:

>In reference to Jake's comments:

>

>>What does spread spectrum really offer us that FM doesn't? Well,  
>>other stations can re-use the same spectrum and the only penalty is a  
>>steadily reduced s/n. Under certain conditions, narrow band users and  
>>spread spectrum users can coexist. And last, it offers some  
>>intriguing possibilities for higher speed communications or weak  
>>signal recovery where multiple echoes are unavoidable (such as with  
>>EME or other backscatter communications paths).

>

>It's interesting that you compare SS and FM. Looked at the right way,  
>FM is a form of analog SS, since it also increases signal fidelity by  
>the use of greater bandwidth (depending on the modulation index). I  
>also want to point out that the assumption is always that SS is a  
>digital form of communication. It needn't be - any more than FM is  
>digital because you can do FSK with it. It may not make any \*sense\*  
>to talk about analog implementations (give, as you pointed out, that  
>everything seems to be tied to a computer these days), but SS itself  
>doesn't have to be digital. In fact, most of the early "noise modulation"  
>systems weren't.

The major advantage to using SS for digital communications is that one  
can easily limit (slice?) the base-band and reacquire the signal.  
Further, I tend to advocate the use of digital communications with SS  
because most construction schemes are already well in to digital  
methods anyhow.

<snip>

>Even after we decide on the system parameters, there's still a ton of  
>implementation details where hams can get ahead of industry. For instance,  
>synchronization is a problem in direct sequence systems, and the magnitude  
>of the problem gets bigger as you use longer and longer spreading sequences.  
>The traditional solution is to brute-force search every possible offset  
>until the sequence in your receiver aligns with the sequence in the  
>transmitted signal (at which point the signal despreads and you can start  
>your QSO). There are methods out there that are more elegant than the  
>brute-force search, but current SS system spreading sequences are short  
>enough that a custom ASIC is able to handle the synchronization. That may  
>not always be the case. If we were to come up with something better,  
>though, it would be completely invisible to the end-user application -  
>does that mean it's not worth investigating?

Synchronization issues may be side-stepped if we rely on the transcode  
repeater to transmit a pilot continuously or at some regular interval.  
Users would have to sync up to the output, and the precise transmit  
phase would have much to do with how far away from the repeater they  
are. I think the transcode-repeaters should stay fixed at certain  
phases with reference to each other, however, so that they don't  
accidentally link up or interfere with other users.

Even if initial aquisition times were on the order of many seconds,  
once an appropriate sending chip phase is found, the train-up time  
should be minimal (as long as you don't move). After all, you'll have  
the transcoder phase to keep you lined up.

In other words, users would try to "kerchunk" the transcoder to find  
the input phase from their current position. Once known, that input  
phase reference to the output should be stored. The transcoder could  
be allowed to track incoming phase up to some point, though the  
transcoder could also send telemetry back (perhaps via some power  
control subcarrier?) on phase accuracy.

>>It may even be feasible to put something like this on board a  
>>satellite.

>

>Now \*this\* may be a real combination of interests. First of all, you're  
>getting an increasing level of fading protection as the bandwidth  
>increases. Second, you can run this sort of service as an overlay with

>the narrowband satellite users without either community interfering with  
>the other.

The problem with this approach is two-fold: First, s/n on satellite links can be quite marginal as is. Each SS signal will reduce that already small s/n for the narrow band users. I don't envision many SS users on such a bird. Second, chip phase tracking is going to be a problem when doppler effects are thrown in. Neither of these problems are insurmountable. However, it does tend to dictate the use of shorter codes so that users can train up rapidly. Unlike the transcode repeater which is always there, the satellite may not be visible at all hours.

>My only caution here is that you don't want to do any spreading/despreading  
>on board the satellite. A nice, wide transponder pipe's all that's needed.  
>Keep all of the SS applications here on earth, so that we can change and  
>upgrade them as our interests change and technology improves.

>One other application that might be interesting is HF SS, if the regulators  
>ever allow it. Here's a channel with lots of multipath fading (which  
>SS excels at combating) and not enough bandwidth for all of the narrowband  
>users who want it. An HF SS overlay helps fix both problems.

Folks have been saying this for years. Until standards are set and well known, however, you can bet that most international legislatures are going to be very reluctant to allow "coded" transmissions --even if for valid reasons. It might be easier to sell a FEC "mangling system" to these legislatures, if you catch my drift...

Jake Brodsky, <mailto:frussle@erols.com>  
"Nearly fifty percent of all graduates came from  
the bottom half of the class."

---

## 17. Re: [SS:1710] Re: pathloss, responses and summary (long)

From: "Alan J. Eynon" <[aeynon@micro.ti.com](mailto:aeynon@micro.ti.com)>  
Date: Fri, 05 Sep 1997 09:46:14 -0500  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <3.0.3.32.19970905094614.006ce86c@pcmail.micro.ti.com>  
Rendered body type: text/plain

<discussion of pilot-aided synchronization omitted>

Side-stepping synchronization with a transmitted pilot is a good way to get around the technical difficulties of spread spectrum, and I'd very much like to hear more about your design. It's clear that your emphasis is on setting up an application for widespread use.

My focus is entirely different, and that may cause us to talk right past each other. For me, the opportunity in spread spectrum is to explore new ways to tackle old problems like synchronization - stuff that industry won't be needing anytime soon (shades of ham FM). I severely doubt that this is going to be a "killer app" that will set the ham radio community on fire, but it helps to keep the technical/experimental edge on the hobby.

>>>It may even be feasible to put something like this on board a  
>>>satellite.  
>>  
>>Now \*this\* may be a real combination of interests. First of all, you're  
>>getting an increasing level of fading protection as the bandwidth  
>>increases. Second, you can run this sort of service as an overlay with  
>>the narrowband satellite users without either community interfering with  
>>the other.  
>

>The problem with this approach is two-fold: First, s/n on satellite  
>links can be quite marginal as is. Each SS signal will reduce that  
>already small s/n for the narrow band users. I don't envision many SS  
>users on such a bird. Second, chip phase tracking is going to be a  
>problem when doppler effects are thrown in. Neither of these problems  
>are insurmountable. However, it does tend to dictate the use of  
>shorter codes so that users can train up rapidly. Unlike the  
>transcode repeater which is always there, the satellite may not be  
>visible at all hours.

Regarding SNR, I've been curious about this. If the power spectral density of my spread carrier is below the noise floor of the transponder, does it affect the narrowband users at all? What if I took it a step further and spread the signal (presuming the transponder bandwidth is sufficient) such that it's below the noise threshold of the preamps of

the narrowband users? I'm wondering if a carefully designed SS net could be set up such that the combined power densities of their spread carriers would still be undetectable.

Regarding acquisition in a doppler environment, this may not be the ferocious problem you think. If you plot despread power on a 3-D graph\* versus frequency offset and spreading sequence offset, what you'll get is a sharp cutoff in the allowable spreading sequence offset (you're hosed if you're off by more than half a chip in a direct sequence system), but the frequency offset is quite a bit more tolerant. Offsets of up to half your baseband data rate probably aren't going to kill you, depending on your fade margins, etc, that is - your mileage may vary.

\*I've attempted to attach an mspaint file showing the correlator output power. The "r" in the diagram is the baseband data rate.

And if you're using a transmitted reference system to sidestep the problem, it should work equally easily through a transponder.

73,  
Alan  
N3IRL  
[Attachment: corr.bmp; application/octet-stream; 461,438 bytes]

---

## 18. Re: [SS:1709] Re: Feeding the modem

From: Jim Jefferson <cjeffers@luminet.net>  
Date: Fri, 05 Sep 1997 20:29:19 -0500  
To: ss@tapr.org  
Message-ID: <1.5.4.32.19970906012919.006f990c@luminet.net>  
Rendered body type: text/plain

>Ahhhh, but there are lots and lots of old systems out there. The classic  
>Macs can be had for less than \$200 and even 68030 systems (that would  
>run MkLinux) are available for less than \$400. Better yet, every Mac  
>ever made had to pass FCC certification so they are much quieter for  
>radio use. When I can buy an entire computer for less than the price  
>of the interface card to go in your PC, the solution isn't very hard.

Um, I for one wouldn't even think about using a mac for this job. Linux for the x86 (or alpha's or sparcs even) is better suited. Plus, when did ethernet cards cost \$400 (I get mine for \$6).

Not to start a "my OS is better then your OS", but I don't think we should limit ourselves to one platform.

73's de

-Jim Jefferson KB0THN  
cjeffers@luminet.net  
<http://www.luminet.net/~cjeffers/>

---

## 19. Re: pathloss, responses and summary (long)

From: Don Lemke <wb9mjn@wb9mjn.ampr.org>  
Date: Sat, 06 Sep 1997 11:24:18 -0500  
To: ss@tapr.org  
Message-ID: <341183B2.3B41@wb9mjn.ampr.org>  
Rendered body type: text/plain

Hi Glenn,

> My problem with your scenario is precisely the 20 dB excess loss number  
> you are using. I don't think amateurs can come up with paths, on  
> average, that are anywhere near that good. DDMA would be fine if there  
> was a diversity of paths to choose among. I'm saying that on average I  
> don't think there is even a single path! The only paths that exist are  
> insufficient to support the required data rate.

I think you have misunderstood me. The idea is to use only paths with line of sight or less path loss. And the next reuse has the parasitic (interfering) path 20 dB down from line of sight, plus the extra path length path loss. But, 20 dB less signal, for sure.

In ur remarks, you apparently think that I want to use the grazing paths. In the earlier days of Packet, when there were fewer people interested in data communications, since Web Surfing had not happened yet, I proposed the CELLNET system. The primary purpose of which was to get a basic 56 KB coverage in states without big multipath problems.

That is a most of the midwestern states. In the paper in the ARRL CNC, I wrote up the link budgets with grazing paths, since this was a UHF system. UHF was used for economic reasons, as there were not as many people interested in data communications, then.

On microwaves, grazing paths are not practical due to economics. That extra 20 dB of power is just too expensive. So for DDMA-WAN, I have never proposed using grazing paths (those paths with 20 dB more loss than LOS), only 1st Fresnel paths.

Now, I believe its your contention that we cannot even get grazing paths between the average ham stations. Let alone 1st Fresnel clearance paths. This is where we differ.

In commercial applications, to get 1st Fresnel clearance paths, microwave engineers sweat over topographic data. The result being locations, tower heights, antenna gains, and antenna pointing bearings to do the needed job. While the successful German Flexnet system is similar to this, I think this method is untenable for infrastructureless systems. The rolling hills of middle Europe, are far and away different from allot of the US Ham QTH's.

The DDMA-WAN / Hubmaster system goals are access, and transport, not only transport (such as with FLEXNET). The average ham does not have the resources to do the Point-to-Point path engineering required for the Hubmaster system. It has to be automatic. That is why DDMA-WAN requires the azimuthal scanning antenna. And the capability to measure paths.

Its my contention that this oportunistic capability of the DDMA-WAN system, is sufficient to develop a network of 1st Fresnel paths. Starting with two stations, one being an internet gateway.

--

73, Don.

AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]  
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu  
Website: <http://www.qth.com/antpanel>

---

## 20. Re: [SS:1711] Re: pathloss, responses and summary (long)

From: dkelly@hiwaay.net  
Date: Sat, 06 Sep 1997 15:12:52 -0500  
To: ss@tapr.org  
Message-ID: <199709062012.PAA26894@nosspam.hiwaay.net>  
Rendered body type: text/plain

Alan J. Eynon writes:

>

> \*I've attempted to attach an mspaint file showing the correlator output  
> power. The "r" in the diagram is the baseband data rate.

Nice graphic. But 640k messages are probably a bit too big?

--

David Kelly N4HHE, dkelly@hiwaay.net

=====

The human mind ordinarily operates at only ten percent of its capacity -- the rest is overhead for the operating system.

---

## 21. From AX.25 to Ethernet for SS

From: Lawrence Gruber <lawrence@javanet.com>  
Date: Mon, 08 Sep 1997 01:41:56 -0400  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19970908014156.0069f3d0@javanet.com>  
Rendered body type: text/plain

Dear email subscribers to the SS division of TAPR,

My idea is to take the Rx/Tx data stream from a high speed (> 1 Mbps) packet/SS transceiver and run it through some sort of ethernet transceiver chip or "simulator" which would allow connection to a PC's bus by means of an inexpensive ethernet adaptor card. Thus, the system would be compatable with any computer operating system that supports an ethernet adaptor. No special device drivers would have to be written as they are supplied by the

manufacturer of the adaptor, and the OS would handle it efficiently, and without software bugs, with its internal TCP/IP stack and interface.

This would allow for very exciting wireless network connectivity, via. for example Window's 95 network (SMB) shares. Thus, radio amateurs many miles apart would have access to each others' shared directories and applications, and could run such applications as Microsoft's Netmeeting, which provides a form of remote console control as well as voice communications, and file transfer.

Thus we could experiment with exciting new low cost solutions to SS communications at high data rates. Perhaps when the Part 97 rules are relaxed (due to the most excellent efforts of Bob Buaas and others at TAPR) we would be able to experiment with devices such as the AMI SX043 SS Controller (when it's PN sequences is permitted), build systems for 23 cm. and higher and at TI speeds (1.54 Mbps), and have fun building really neat UHF SS gear. This would put things back into the aegis of the radio amateur rather than the computer interface systems designer.

If we could come up with a circuit design for an effective ethernet interface (which has already been done by the JNOS, KA9Q people for AX.25, using a DOS computer's serial port), then we could concentrate on the fun part, the building of spread-spectrum transceivers and not have to be concerned with the issue of computer interfaces and the constantly changing world of virtual device drivers, etc. (e.g. when Win98 comes out, VxD's will be obsolete, as it uses the NT device driver model).

Does anyone out there have some expertise or know of where to seek information on the subject of taking the Rx/Tx data stream and interfacing it to a, say 10 Mbps ethernet card?

I think it as a low-cost solution which will not "expire" with changing O.S. architectures. It will be the manufacturers' of the ethernet cards who will have to produce the new device drivers, not the radio amateur hobbyist.

Larry (Lawrence) Gruber  
Medford, Massachusetts USA  
lawrence@javanet.com

---

## 22. Re: [SS:1715] From AX.25 to Ethernet for SS

From: Bill Steffey <wsteffey@steffeymktg.com>  
Date: Mon, 08 Sep 1997 07:15:07 -0500  
To: ss@tapr.org  
Message-ID: <2.2.32.19970908121507.006a504c@pop.interaccess.com>  
Rendered body type: text/plain

At 12:45 AM 9/8/97 -0500, you wrote:

>Dear email subscribers to the SS division of TAPR,  
>

>My idea is to take the Rx/Tx data stream from a high speed (> 1 Mbps)  
>packet/SS transceiver and run it through some sort of ethernet transceiver  
>chip or "simulator" which would allow connection to a PC's bus by means of  
>an inexpensive ethernet adaptor card. Thus, the system would be compatable  
>with any computer operating system that supports an ethernet adaptor. No  
>special device drivers would have to be written as they are supplied by the  
>manufacturer of the adaptor, and the OS would handle it efficiently, and  
>without software bugs, with its internal TCP/IP stack and interface.  
>

>This would allow for very exciting wireless network connectivity, via. for  
>example Window's 95 network (SMB) shares. Thus, radio amateurs many miles  
>apart would have access to each others' shared directories and  
>applications, and could run such applications as Microsoft's Netmeeting,  
>which provides a form of remote console control as well as voice  
>communications, and file transfer.  
>

>Thus we could experiment with exciting new low cost solutions to SS  
>communications at high data rates. Perhaps when the Part 97 rules are  
>relaxed (due to the most excellent efforts of Bob Buaas and others at TAPR)  
>we would be able to experiment with devices such as the AMI SX043 SS

>Controller (when it's PN sequences is permitted), build systems for 23 cm.  
>and higher and at TI speeds (1.54 Mbps), and have fun building really neat  
>UHF SS gear. This would put things back into the aegis of the radio amateur  
>rather than the computer interface systems designer.  
>  
>If we could come up with a circuit design for an effective ethernet  
>interface (which has already been done by the JN0S, KA9Q people for AX.25,  
>using a DOS computer's serial port), then we could concentrate on the fun  
>part, the building of spread-spectrum transceivers and not have to be  
>concerned with the issue of computer interfaces and the constantly changing  
>world of virtual device drivers, etc. (e.g. when Win98 comes out, VxD's  
>will be obsolete, as it uses the NT device driver model).  
>  
>Does anyone out there have some expertise or know of where to seek  
>information on the subject of taking the Rx/Tx data stream and interfacing  
>it to a, say 10 Mbps ethernet card?  
>  
>I think it as a low-cost solution which will not "expire" with changing  
>O.S. architectures. It will be the manufacturers' of the ethernet cards who  
>will have to produce the new device drivers, not the radio amateur hobbyist.  
>  
>>  
>Larry (Lawrence) Gruber  
>Medford, Massachusetts USA  
>lawrence@javanet.com  
>  
take a look at breezecom.com      breezenet....

## 23. Re: [SS:1712] Re: Feeding the modem

From: Mike Murphree <n4cnw@ibm.net>  
Date: Mon, 08 Sep 1997 12:04:19 -0400  
To: ss@tapr.org  
Message-ID: <34142202.FE817133@ibm.net>  
Rendered body type: text/plain

Jim Jefferson wrote:

>  
> Um, I for one wouldn't even think about using a mac for this job.  
> Linux  
> for the x86 (or alpha's or sparcs even) is better suited.

Assuming MkLinux is still Linux, albeit at different stages of  
development, why does it matter what HARDWARE it runs on??

> Plus, when  
> did ethernet cards cost \$400 (I get mine for \$6).

The discussion wasn't about ethernet cards. It was about driving >= 56  
Kbps  
modems. The current (cheapest) solutions are a) a card that plugs in  
your PC  
(8530 or eq), or b) a souped TNC. Both of these solutions fall  
somewhere  
between \$150-250. If you really one to go high-end, then you can pick up  
a  
PacTen controller or maybe a Kantronics DataEngine for much more \$\$\$.

> Not to start a "my OS is better then your OS", but I don't think we  
> should limit ourselves to one platform.

I don't think anyone ever advocated that. The discussion was about  
MkLinux, not whether we should be using Mac, Windoze, OS/2, etc  
operating systems. Personally, I don't care what anyone else uses,  
as it long as it makes them happy and does the job. Computers are  
\*tools\*, not religions.

I believe the focus of Dale's original comment, was that some older Macs  
are available for cheap, have the necessary interface ports, and if some  
appropriate software could be found, they would be useful. This is one  
guy's  
solution to a problem that carries as much merit as the rest of the  
possible solutions.

73

--  
Mike N4CNW    n4cnw@ibm.net, n4cnw@amsat.org,

mike.murphree@boeing.com

"A human being is the best computer available to place  
in a spacecraft.... It is also the only one that can  
be mass produced with unskilled labor."  
-- Werner Von Braun

---

## 24. Re: [SS:1716] Re: From AX.25 to Ethernet for SS

From: Lawrence Gruber <lawrence@javanet.com>  
Date: Tue, 09 Sep 1997 00:49:14 -0400  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19970909004914.006a835c@javanet.com>  
Rendered body type: text/plain

Thanks Bill for your tip, but..

>>Dear email subscribers to the SS division of TAPR,  
>>  
>>My idea is to take the Rx/Tx data stream from a high speed (> 1 Mbps)  
>>packet/SS transceiver and run it through some sort of ethernet transceiver  
>>chip or "simulator" which would allow connection to a PC's bus by means of  
>>an inexpensive ethernet adaptor card.

>take a look at breezecom.com     breezenet...  
>

I took a look at their product line on the Web, called them but they  
(Breezecom) don't make a suitable product. However, sales person suggested  
I check out OpenROUTE (www.openroute.com). They have a product called the  
GlobeTrotter 60 which is basically T1 to Ethernet (WAN speeds from 4.8k to  
2.048 mbps). Only thing is the thing lists at \$795. Maybe an ok price for  
commercial but not amateur radio.

Instead, I think I'll just use my old 386 25 Mhz. DOS computer and use it  
as a router running JNOS. Being a C lang. programmer, I'll just tear into  
the source code and get it to do what I want. Maybe parallel (printer) port  
to ethernet. or some custom A/D adaptor on the ISA bus to ethernet. I don't  
know.

Sincerely,

Larry (Lawrence) Gruber  
Medford, Massachusetts USA  
lawrence@javanet.com

---

## 25. Re: [SS:1718] Re: From AX.25 to Ethernet for SS

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Tue, 9 Sep 1997 10:22:56 -0500  
To: ss@tapr.org  
Message-ID: <v03110730b03b180d42e8@[208.134.134.40]>  
Rendered body type: text/plain

>I took a look at their product line on the Web, called them but they  
>(Breezecom) don't make a suitable product. However, sales person suggested  
>I check out OpenROUTE (www.openroute.com). They have a product called the  
>GlobeTrotter 60 which is basically T1 to Ethernet (WAN speeds from 4.8k to  
>2.048 mbps). Only thing is the thing lists at \$795. Maybe an ok price for  
>commercial but not amateur radio.

Why would you think \$795 a unit is not an acceptable price for amateur  
radio ?

Cheers - Greg

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
http://www.tapr.org/~wd5ivd  
-----

"Before you become too entranced with gorgeous gadgets  
and mesmerizing video displays, let me remind you that  
information is not knowledge, knowledge is not wisdom,  
and wisdom is not foresight. Each grows out of the other



## 26. From AX.25 to Ethernet

From: Glenn Elmore <ge@hpsadr2.sr.hp.com>  
 Date: Tue, 9 Sep 1997 08:57:56 -0800 (PDT)  
 To: ss@tapr.org (ge)  
 Message-ID: <199709091557.AA049110676@hpsadr2.sr.hp.com>  
 Rendered body type: text/plain

Lawrence Gruber <lawrence@javanet.com> wrote:

```
> >>My idea is to take the Rx/Tx data stream from a high speed (> 1 Mbps)
> >>packet/SS transceiver and run it through some sort of ethernet transceiver
> >>chip or "simulator" which would allow connection to a PC's bus by means of
> >>an inexpensive ethernet adaptor card.
```

<breezecom.com>

```
>
> I took a look at their product line on the Web, called them but they
> (Breezecom) don't make a suitable product. However, sales person suggested
> I check out OpenROUTE (www.openroute.com). They have a product called the
> GlobeTrotter 60 which is basically T1 to Ethernet (WAN speeds from 4.8k to
> 2.048 mbps). Only thing is the thing lists at $795. Maybe an ok price for
> commercial but not amateur radio.
>
> Instead, I think I'll just use my old 386 25 Mhz. DOS computer and use it
> as a router running JNOS. Being a C lang. programmer, I'll just tear into
> the source code and get it to do what I want. Maybe parallel (printer) port
> to ethernet. or some custom A/D adaptor on the ISA bus to ethernet. I don't
> know.
```

Larry

Perhaps you have already exhausted these two trails but in case you haven't, what about:

- (1) An Ottawa PI Card
- (2) An Ethernet card with the 20 MHz clock replaced with something much slower.

Each solution allows existing drivers to control data streams in/out of hardware at significant speeds. I'm not sure that they are general enough for what you need though.

The PI card is capable of at least 230 Kbps with internal clock recovery, faster(600+ kbps?) if you want to use the 20 MHz parts and change the clock. If you have a means of external clock/recovery you might be able to handle an arbitrary bit stream with a little carving. This should allow you to go several times as fast as internal clock recovery allows (clock/32).

I suppose an Ethernet card may be too tailored for your needs since it is going to tend to want to implement 802.3 and might be difficult to force into compatability with an existing SS radio. I don't know. I think that it can cover the 'higher ground' between a few hundred kbps where the PI card might leave off on up to 10 Mbps. We at least know that ne2000-like cards will run at 2 Mbps.

Also, I believe that isn't too difficult to split the Ethernet into tx and rx streams with a little bit of logic and a current driver. This becomes a 'media access unit' for radio. I can elaborate if you are interested.

In any case both cards are, in my opinion, good values and capable of interfacing faster bit streams and have existing drivers. Perhaps you can make use of one or both.

Just in case this helps.

73  
 Glenn n6gn

## 27. Re: [SS:1719] Re: From AX.25 to Ethernet for SS

From: Lawrence Gruber <lawrence@javanet.com>  
 Date: Wed, 10 Sep 1997 00:59:50 -0400  
 To: ss@tapr.org  
 Message-ID: <3.0.3.32.19970910005950.00698ba4@javanet.com>  
 Rendered body type: text/plain

At 10:41 AM 9/9/97 -0500, you wrote:  
 >>I took a look at their product line on the Web, called them but they  
 >>(Breezecom) don't make a suitable product. However, sales person suggested  
 >>I check out OpenROUTE (www.openroute.com). They have a product called the  
 >>GlobeTrotter 60 which is basically T1 to Ethernet (WAN speeds from 4.8k to  
 >>2.048 mbps). Only thing is the thing lists at \$795. Maybe an ok price for  
 >>commercial but not amateur radio.  
 >  
 >Why would you think \$795 a unit is not an acceptable price for amateur  
 >radio ?  
 >  
 >Cheers - Greg  
 >  
 >-----  
 >Greg Jones, WD5IVD  
 >Austin, Texas  
 >wd5ivd@tapr.org

You're absolutely right Greg. The street price of this unit would probably be something like \$650. But, I consider this device to be in the category of computer hardware. And, I'm used to buying complete Pentium motherboards with processor and memory for under \$450. This device (the GlobeTrotter 60) probably consists of something like an ethernet transceiver chip, a Rotamola MC68000 family microprocessor, some volatile memory, an EPROM, and some miscellaneous glue chips. Probably less than \$100 worth of components. And, how do we know it's going to work perfectly for our application with a Digital transceiver? We don't. If I were smart enough, I'd reverse engineer the thing, optimize it for amateur radio use and sell it through TAPR as a \$250 kit! As SS continues to mature and as amateurs graduate from DOS to Window's 95(98) OS's, I expect this sort of interface would be in reasonable demand.

In the meantime, I'm going to see what can be done with JNOS, to see if I can find some way to pump a 1 or 2Mbps. data stream into it, maybe through the p.c.'s parallel port, and have it do the necessary error-correction and packet construction for TCP/IP ethernet protocols. My old computer would be perfect for the job. It's a software digression I wasn't planning on. I really should be studying to get my Technician license, since it's a bit embarrassing talking to all you TAPR people who have amateur licenses and I don't..yet.

Larry (Lawrence) Gruber  
 Medford, Massachusetts USA  
 lawrence@javanet.com

---

## 28. Re: [SS:1721] Re: From AX.25 to Ethernet for SS

From: Bob Nielsen <nielsen@primenet.com>  
 Date: Wed, 10 Sep 1997 08:37:56 -0700 (MST)  
 To: ss@tapr.org  
 Message-ID: <Pine.LNX.3.96.970910083033.1551C-100000@nielsen.tus.primenet.com>  
 Rendered body type: text/plain

On Wed, 10 Sep 1997, Lawrence Gruber wrote:

>  
 > You're absolutely right Greg. The street price of this unit would probably  
 > be something like \$650. But, I consider this device to be in the category  
 > of computer hardware. And, I'm used to buying complete Pentium motherboards  
 > with processor and memory for under \$450. This device (the GlobeTrotter 60)  
 > probably consists of something like an ethernet transceiver chip, a  
 > Rotamola MC68000 family microprocessor, some volatile memory, an EPROM, and  
 > some miscellaneous glue chips. Probably less than \$100 worth of components.  
 > And, how do we know it's going to work perfectly for our application with a  
 > Digital transceiver? We don't. If I were smart enough, I'd reverse engineer  
 > the thing, optimize it for amateur radio use and sell it through TAPR as a  
 > \$250 kit! As SS continues to mature and as amateurs graduate from DOS to  
 > Window's 95(98) OS's, I expect this sort of interface would be in  
 > reasonable demand.  
 >  
 > In the meantime, I'm going to see what can be done with JNOS, to see if I  
 > can find some way to pump a 1 or 2Mbps. data stream into it, maybe through  
 > the p.c.'s parallel port, and have it do the necessary error-correction and  
 > packet construction for TCP/IP ethernet protocols. My old computer would be  
 > perfect for the job. It's a software digression I wasn't planning on. I  
 > really should be studying to get my Technician license, since it's a bit  
 > embarrassing talking to all you TAPR people who have amateur licenses and I

> don't..yet.

You're paying too much for your motherboards!

But seriously, a device like the Globetrotter would probably be much less if there was an equivalent market to that for motherboards.

I would recommend that you look at Linux for this instead of JNOS.

Get the tech license, too!

73, Bob

-----  
Bob Nielsen                      Internet: nielsen@primenet.com  
Tucson, AZ                      AMPRnet: w6swe@w6swe.ampr.org  
                                 http://www.primenet.com/~nielsen

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## 29. Whats\_New

From: Bob Lorenzini <hwm@netcom.com>  
Date: Wed, 10 Sep 1997 10:28:35 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <Pine.LNX.3.95.970910102341.175A-100000@mm.wd6dod.ampr.org>  
Rendered body type: text/plain

I beleive I read in the PSR that there is some development going on behind the scenes on a SS data radio. I don't want to start a "I want this, I won't that thread" or to create a noise level for the developers, but if possible could we have some sort of progress report if my information is correct?

Bob - wd6dod

---

## 30. Re: [SS:1720] From AX.25 to Ethernet

From: Andre M Salvagnini <andresal@www.ifqsc.sc.usp.br>  
Date: Wed, 10 Sep 1997 20:10:59 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <Pine.BSF.3.95q.970910194842.6827A-100000@www.ifqsc.sc.usp.br>  
Rendered body type: text/plain

Hi All.

I tried to run an NE2000 card at 2Mbps, only replacing the Xtal that controls the clock. No way. The bus slot that the NE2000 card are placed "talk" to the clock card, and I have doubts that someone got success trying decrease velocity at NE2000 card. You can't forgot that 802 protocol expects a preferred packet size. And when you decrease the card speed, packets are big than original and discarded.

How about a Cyclades router? it takes 10Mbps Ethernet and decrease to 2Mbps, with RS422 connector. Prices here in Brazil runs about U\$ 600,00

I'm having success running 115Kbps trough a 2 pair private line cheap modem, and connected to a Gunnplexer, running TCP/IP over FreeBSD. Right now I just received some IC's from RF Micro devices, with "ready to use" SS transceivers and TX/RX as quadrature modulators/demodulators also. Does anyone know or had some experience with these IC's?  
Check the RFMD web page at: [www.rfmd.com](http://www.rfmd.com).

I'm working in an Ethernet NE2000 and Glenn's link. It's \*NOT\* easy, but we are almost there. I don't know if M/A-COM gunnplexer supports more than 6 Mbps due to modulation. I only have a spectrum analyzer that goes up to 2 GHz and I need to do some "miracles" to test it.

Well, I talk a lot about a lot of things, and I apologise by my bad english.

73's

Andre Salvagnini  
PY2NMB

---

## 31. Re: [SS:1722] Re: From AX.25 to Ethernet ss

From: "N0UDZ (Dennis Chambers)" <n0udz@dialnet.net>  
Date: Wed, 10 Sep 1997 20:18:03 -0500 (CDT)  
To: ss@tapr.org

Message-ID: <Pine.LNX.3.95.970910201452.19280B-100000@shell.dialnet.net>  
Rendered body type: text/plain

Is anyone out there sing OS/2 for Spread spectrum communications? I have been an OS/2 user for a long time but was only recently introduced to spread spectrum communications. Any suggestions for a beginner would be appreciated.

Thanx,  
N0UDZ  
Dennis Chambers

---

## 32. Re: AMI SX043 to Ethernet for SS

From: Lawrence Gruber <lawrence@javanet.com>  
Date: Thu, 11 Sep 1997 01:18:15 -0400  
To: ke4zv@bellsouth.net  
Cc: ss@tapr.org  
Message-ID: <3.0.3.32.19970911011815.00696cec@javanet.com>  
Rendered body type: text/plain

Gary,

Thank you very much for your thoughtful reply!  
I have been an avid reader of your interesting and informative comments in the "rec.radio.amateur.digital.misc" . It's great to receive a reply from you.

OK. Now that you told me the "magic answer", HDLC Interface Adaptor, I now don't have to wrestle around with the SS/Radio side interface stuff, as the RS-232 serial port is a bit too slow. I just need to purchase a high-speed HDLC interface card that is supported by JNOS. Searching through various source code modules, I see that JNOS supports the following adaptors:

- PACCOMM PC-100 8530 HDLC adaptor

- PAC-COM PC-100 driver

- DRSI PCPA card in low speed mode

- Hamilton Area Packet Radio (HAPN) 8273 HDLC adaptor
- Hamilton Area Packet Network driver

- FTP Software's packet driver spec
- FTP Software's PACKET driver interface

- Special high speed driver for PI 8530 HDLC adapter -- Is this "Ottawa" PI SCC card with DMA driver (VE3IFB)

- Generic SCC (8530) driver (PE1CHL) //?assumes ISA bus interfacing with bus drivers etc?

- Eagle card 8530 driver

- DRSI PCPA low-speed driver

- Gracilis PackeTwin driver

- SLFP via PACKET driver

Perhaps some of these entries are bogus. So, please correct. Of them, which one would you recommend for high-speed packet, say 1 - 2 Mbps?

Can you help me with more complete manufacturer's names, addresses, phone numbers, URL's, or references to where I might be able to look them up?

As the Slovenian Packet Radio Plan of Matjaz Midmar, S53MV is the only complete plan for a high speed 1.2 Ghz. system I have been able to come up with, and since it interfaces to the Z8530 SCC, perhaps my choice would be biased towards manufacturer's who use this chip.

(Gary R Coffman <ke4zv@bellsouth.net>):  
>You'll need a controller in there to handle the radio channel and handle the  
>ethernet. Even if the idea is to do ethernet over radio, you're still

going to  
>have to wrap the ethernet packets into some sort of Layer 2 envelope on the  
>SS side in order to manage the channel. And it will have to look like a  
>TCP/IP host \*router\* on the ethernet side to make the existing TCP/IP  
stacks in  
>the computers on your LAN happy (unless you're going to use a \*dedicated\*  
>ethernet separate from your regular in house ethernet, and a separate  
>and special driver, for this interface on the host to which it is  
>attached). That's practically a full PC you're asking for when all is  
>said and done.

Yes, and many of us who have migrated to Windows 95/NT, have old 286 or 386  
computers just  
gathering dust. Why not just use it for a multi-purpose router running JNOS  
for a little  
home-network, with an HDLC port coming out the back for the Packet/SS radio  
wireless network link. And, I bet a lot of people all over the TAPR  
community are doing just that!  
(Hey, "old timers" out there....isn't it entertaining reading email from  
beginners!)

>In fact, low end PCs are cheap enough to \*serve\* as the super TNC. We've  
>been doing 56 kb that way for a long time. Stick a HDLC card and a  
>ethernet >card int there, run NOS, and you have your cheap router.

Yes. Thank you. Finally I am learning!! But I want to do a lot better than  
56 Kb.  
Say, one end of your wireless link has access to a very fast Internet  
Provider, say  
a cable TV service; 1.5 Mbps. download, 300 Kbps. upload. And you don't.  
So you  
do a wireless TCP/IP to his and now you can load those web pages through  
his fast provider  
at 1.5 Mbps instead of only 53Kbps. with your X2 landline modem.

>I've looked at this sort of outboard TNC approach several times, and  
>I've decided that drawing everything back inside the computer but the radio  
>part is a better approach than developing special hardware to do the  
>same thing as the PC does. This does require a special HDLC bus card and  
>driver, but it is cheaper, and gives more intimate software control to the  
host,  
>than the super TNC approach.  
>  
>If you can show me I'm wrong, I'll be delighted to give it another look.

No, I now agree with you. The custom "Super TNC Router" approach, as you  
nicely called  
it is for people who have companies making P.C. peripherals or something.  
If I can do it with my old computer, an HDLC adaptor, and JNOS, I'll be a  
happy camper.

Thanks again,

Larry (Lawrence) Gruber  
Medford, Massachusetts USA  
lawrence@javanet.com

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### 33. Re: [SS:1720] From AX.25 to Ethernet

From: Lawrence Gruber <lawrence@javanet.com>  
Date: Thu, 11 Sep 1997 01:52:54 -0400  
To: ss@tapr.org  
Cc: ge@hpsadr2.sr.hp.com  
Message-ID: <3.0.3.32.19970911015254.0069a414@javanet.com>  
Rendered body type: text/plain

Glen, thanks for your very helpful response!

>Larry  
> Perhaps you have already exhausted these two trails but in case you  
> haven't, what about:  
>  
> (1) An Ottawa PI Card  
> (2) An Ethernet card with the 20 MHz clock replaced with something much

> slower.

>

> Each solution allows existing drivers to control data streams in/out  
> of hardware at significant speeds. I'm not sure that they are general  
> enough for what you need though.

Glen, can you give me a reference to the Ottawa PI card?  
Do they have a URL? Or phone number, address, etc.  
I'm a rank beginner and haven't begun to exhaust anything.

Any other HDLC ISA bus interface products supported  
by JNOS that you can recommend? Please include the manufacturer's  
URL or phone number if you can. Thanks!

> The PI card is capable of at least 230 Kbps with internal clock recovery,  
> faster(600+ kbps?) if you want to use the 20 MHz parts and change the  
clock.

> If you have a means of external clock/recovery you might be able to handle  
> an arbitrary bit stream with a little carving. This should allow you to go  
> several times as fast as internal clock recovery allows (clock/32).

I've sort of had enough "carving" with digital and interface electronics.  
I'd rather be carving at UHF microstrips and  
interdigital filters! But, please, thank's for the suggestion.

>

> Also, I believe that isn't too difficult to split the Ethernet into  
> tx and rx streams with a little bit of logic and a current driver.  
> This becomes a 'media access unit' for radio. I can elaborate if you  
> are interested.

Glen, thanks, but after doing some thinking, I would rather  
concentrate on the R.F. (design) project building and the Spread  
Spectrum (or hs packet) stuff, and find an easy solution for the HDLC  
interface and ethernet TCP/IP stuff. So, my current plan is to use my old  
386 25 Mhz. computer with an HDLC TNC adaptor and Ethernet adaptor and  
run JNOS.

Thanks very much for your reply!

Larry (Lawrence) Gruber  
Medford, Massachusetts USA  
lawrence@javanet.com

---

## 34. Re: [SS:1722] Re: From AX.25 to Ethernet for SS

From: Lawrence Gruber <lawrence@javanet.com>  
Date: Thu, 11 Sep 1997 03:52:58 -0400  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19970911035258.00698310@javanet.com>  
Rendered body type: text/plain

Bob,

Thanks for the reply.

>You're paying too much for your motherboards!

Come on..an Intel board with a Pentium 166 and 16 Megs of RAM! :-)

>But seriously, a device like the Globetrotter would probably be much less  
>if there was an equivalent market to that for motherboards.

Of course! I realize this product is being sold to a rather  
limited corporate market. But, only it only took me a few days  
to get off this kick of having such a custom product/design  
as a solution.

>

>I would recommend that you look at Linux for this instead of JNOS.

Why do you say this? Is there an advantage to the Linux AX.25  
stuff over JNOS for my particular needs?

I have no experience with UNIX OS's but, prior to Window's  
API programming, I've done a whole lot of DOS programming and can  
understand the JNOS source code. Remember, I only need a router with HDLC  
at one end and TCP/IP ethernet at the other for a very  
small home LAN, and at say at faster than 1 Mbps.

By the way, can you recommend an HDLC adaptor for JNOS that will be fast enough. Do you know of any designs using, say, the Z8530 with an ISA bus interface that is compatible with the existing JNOS drivers.

Sincerely,

Larry (Lawrence) Gruber  
Medford, Massachusetts USA  
lawrence@javanet.com

---

### 35. Re: From AX.25 to Ethernet for SS

From: efbrya - Eric Bryan <efbrya@acxiom.com>  
Date: Thu, 11 Sep 1997 12:47:44 -0500  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <c=US%a=\_%p=Acxiom\_Corporati%l=P0-CONWAY-1-970911174744Z-16461@po-conway-1.conway.acxiom.com>  
Rendered body type: text/plain

What about looking forward to the next generation? I'm thinking about USB. All the new motherboards for Intel should support this and there are microcontrollers with USB support built in. That should make possible cheap interfaces (and interface cards for those older PCs stacked in my house!). Has anyone else looked at/thought about this instead of ethernet?

Eric Bryan  
efbrya@acxiom.com

---

### 36. Looking for someone with actual experience with the Ottawa PI Card

From: atlas@quiknet.com  
Date: Thu, 11 Sep 1997 20:24:56 -0700  
To: ss@tapr.org  
Message-ID: <3418B608.713A@quiknet.com>  
Rendered body type: text/plain

I have heard a lot of claims for high speed data communication with the Ottawa PI Card (115Kbs or greater) however, the proven path offered on the web site for the Ottawa card specifies a default to a 56kbs modem. I have heard many claims for data rates of 230Kbs and even 1.5Mbps or greater, but have not been able to find anyone that has actually done it.

Does anyone know of anyone who has configured a 2.4ghz or higher system for high speed using this or another interface card? Can you point me to them?

Sincerely,

Robb GreatHouse

---

### 37. Re: [SS:1730] Looking for...experience with Ottawa PI Card

From: Lawrence Gruber <lawrence@javanet.com>  
Date: Fri, 12 Sep 1997 02:03:35 -0400  
To: ss@tapr.org  
Cc: Glenn Elmore <ge@hpsadr2.sr.hp.com>  
Message-ID: <3.0.3.32.19970912020335.006b5784@javanet.com>  
Rendered body type: text/plain

Hi Robb, Cc: Glen Elmore, N6GN

At 10:25 PM 9/11/97 -0500, you wrote:  
>I have heard a lot of claims for high speed data communication with the  
>Ottawa PI Card (115Kbs or greater) however, the proven path offered on  
>the web site for the Ottawa card specifies a default to a 56kbs modem. I  
>have heard many claims for data rates of 230Kbs and even 1.5Mbps or  
>greater, but have not been able to find anyone that has actually done  
>it.  
>  
>Does anyone know of anyone who has configured a 2.4ghz or higher system  
>for high speed using this or another interface card? Can you point me  
>to them?

This is what the most knowledgeable and experienced Glenn Elmore, K6GN told me in a recent email:

"The PI card is capable of at least 230 Kbps with internal clock recovery, faster(600+ kbps?) if you want to use the 20 MHz parts and change the clock. If you have a means of external clock/recovery you might be able to handle an arbitrary bit stream with a little carving. This should allow you to go several times as fast as internal clock recovery allows (clock/32)."

(Glen, hope you don't mind me quoting you here)

The commercial Z8530 stuff is getting to be ancient history and/or unavailable.

Are you thinking of using JNOS? I think that a NEW High Speed Packet Radio/SS Modem design and realization on a P.C.B. bus card with the HDLC stuff, etc. for the ISA bus with at least DOS drivers is due. Maybe even WAY OVER DUE!

I think there is need for an interface that will do at least 1 Mbps. It should be a real "shot in the arm" for high speed packet and spread spectrum amateur radio.

JNOS seems to be a practical solution as a home router, and so many of us have old computers to run it.

There currently just doesn't seem to be anything out there in the way of high speed radio modem interfaces...a rather unfortunate situation! I think it's holding back the progress of high speed packet and SS radio.

So, I'm looking for better silicon and am currently looking at the Motorola MC68605. Here's the MC68605 blurb from the Motorola Master Selection Guide:

"In addition to handling the lower level comm. functions (HDLC framing, CRC generation/checking, and zero insertion/deletion), the XPC also independently handles higher level comm. functions (frame sequencing, retransmission, flow control, retries limit and timeout conditions), etc."

I don't think that writing the DOS device (DMA) drivers (full duplex) using this device for JNOS would be too horribly difficult. I think its around a \$44 dollar part (for the 10 Mhz version)--Certainly within our budgets.

Let me know where you're at.

Larry (Lawrence) Gruber  
Medford, Massachusetts USA  
lawrence@javanet.com

---

### 38. Re: [SS:1711] Re: pathloss, responses and summary (long)

From: Phil Karn <karn@qualcomm.com>  
Date: Thu, 11 Sep 1997 18:11:42 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <m0x9KGs-000HRJC@laptop.ka9q.ampr.org>  
Rendered body type: text/plain

>Side-stepping synchronization with a transmitted pilot is a good way  
>to get around the technical difficulties of spread spectrum, and I'd  
>very much like to hear more about your design. It's clear that your  
>emphasis is on setting up an application for widespread use.

Pilots are already in widespread use in commercial SS systems. The IS-95 CDMA forward link relies very heavily on a pilot.

GPS uses two spreading sequences, a short C/A code and a long P code, with the idea being that the C/A code would permit rough acquisition of timing sufficient to permit acquisition of the P code. The C/A code can thus be thought of as a pilot. In practice, though, most civilian GPS receivers use only the C/A code.

>Regarding SNR, I've been curious about this. If the power spectral



>density of my spread carrier is below the noise floor of the transponder,  
>does it affect the narrowband users at all? What if I took it a step

Transponders are linear creatures, so there is no threshold below which interference goes exactly to zero, though it may well be negligible and perhaps even undetectable. Note that even measuring a small change in noise level (e.g., background noise plus a very weak SS signal) is itself tricky because of the fluctuations of the background noise signal. Measuring smaller and smaller changes in noise level require longer and longer measurement averaging times.

>Regarding acquisition in a doppler environment, this may not be the  
>ferocious problem you think. If you plot despread power on a 3-D graph\*

Depends on the SNR. If you have lots of excess power, you can acquire a DSSS signal with a relatively wide filter after the despreaders, wide enough to accommodate the max expected doppler shift. If you don't have a lot of signal power, though, you will have to use a narrow filter and sweep it through the max range of doppler shift at the same time you are sweeping the local code generator through its possible time offsets. This increases the dimension of the search space, which can greatly increase the acquisition time.

Phil

---

### 39. Re: [SS:1731] Re: Looking for...experience with Ottawa PI Card

From: Jeff King <jeff@mich.com>  
Date: Fri, 12 Sep 1997 09:34:40 -0400  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19970912093440.009b2ea0@mail.mich.com>  
Rendered body type: text/plain

At 01:13 AM 9/12/97 -0500, Lawrence Gruber wrote:

>  
>There currently just doesn't seem to be anything out there in the way of  
>high speed radio modem interfaces...a rather unfortunate situation! I think  
>it's holding back the progress of high speed packet and SS radio.  
>

Actually, there is quite a bit out there. Its just all Part 15 stuff. Doesn't bother me much though... radio is radio and with the TAPR SS STA you can more or less do what you want. And even within the bounds of Part 15 there is quite a bit you can do.

The ATT Wavelan is one that alot of experimenters use and has some third party drivers and source. And of course, any number of SS evaluation boards are available. Harris will shortly be releasing a PRISM chip eval board on a ISA bus, they currently have it on a PCMCIA board. All these units are 1megabit or greater.

Price per bit (and in some cases, even per end) is as good or better then any existing amateur solution. Street price on a ATT Wavelan is about \$550 and that includes the radio and pad ('tnc'). A Grapes 56K modem with PAD and transverter will set you back around 700-800 usd. A Kantronics D4-10 (rip) and high speed TNC2 would have come in at about at about \$450 or so. And that was 19.2kbaud.

For experimenters, I'd say maybe one of the eval boards would be best. I've not seen the one from AMI, but its chip set is fairly flexible as far as spreading code length goes. Has anyone played with one of these? I'm thinking of the SX043.

Regards,

-----  
| Jeff King           Aero Data Systems |  
| jeff@mich.com   P.O. Box 510895   |  
| (810)471-1787   Livonia, MI 48151 |  
| F(810)471-0279   United States    |  
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### 40. Re: [SS:1726] Re: AMI SX043 to Ethernet for SS

From: Gwyn Reedy <gwyn@paccomm.com>  
Date: Wed, 17 Sep 1997 07:55:35 -0400  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19970917075535.006bff3c@lantz.com>  
Rendered body type: text/plain

For everyone's information: The PacComm (and older spelling Pac-Comm) cards are out of production, same for DRSI models. I think the EAGLE was a surplus item 7-8 years ago, so likely unavailable now.

Searching through various source code modules, I see  
>that JNOS supports the following adaptors:  
>  
>     PACCOMM PC-100 8530 HDLC adaptor  
>  
>     PAC-COM PC-100 driver  
>  
>     DRSI PCPA card in low speed mode  
>  
>     Hamilton Area Packet Radio (HAPN) 8273 HDLC adaptor  
>     Hamilton Area Packet Network driver  
>  
>     FTP Software's packet driver spec  
>     FTP Software's PACKET driver interface  
>  
>     Special high speed driver for PI 8530 HDLC adapter -- Is this "Ottawa"  
>     PI SCC card with DMA driver (VE3IFB)  
>  
>     Generic SCC (8530) driver (PE1CHL) //?assumes ISA bus interfacing with  
bus >drivers etc?  
>  
>     Eagle card 8530 driver  
>  
>     DRSI PCPA low-speed driver  
>  
>     Gracilis PackeTwin driver  
>  
>     SLFP via PACKET driver  
>  
>Perhaps some of these entries are bogus. So, please correct.

---

#### 41. Re: [SS:1732] Re: pathloss, responses and summary (long)

From: "James T. McCartney III" <jtmiii@uisx.skdk.com>  
Date: Tue, 23 Sep 1997 19:11:33 -0400  
To: ss@tapr.org  
Message-ID: <3.0.1.32.19970923191133.0097bb70@uisx.skdk.com>  
Rendered body type: text/plain

At 01:35 AM 9/12/97 -0500, you wrote:  
>>Side-stepping synchronization with a transmitted pilot is a good way  
>>to get around the technical difficulties of spread spectrum, and I'd  
>>very much like to hear more about your design. It's clear that your  
>>emphasis is on setting up an application for widespread use.  
>  
>Pilots are already in widespread use in commercial SS systems. The  
>IS-95 CDMA forward link relies very heavily on a pilot.  
>  
>GPS uses two spreading sequences, a short C/A code and a long P code,  
>with the idea being that the C/A code would permit rough acquisition  
>of timing sufficient to permit acquisition of the P code. The C/A code  
>can thus be thought of as a pilot. In practice, though, most civilian  
>GPS receivers use only the C/A code.  
>  
>>Regarding SNR, I've been curious about this. If the power spectral  
>>density of my spread carrier is below the noise floor of the transponder,  
>>does it affect the narrowband users at all? What if I took it a step  
>  
>Transponders are linear creatures, so there is no threshold below  
>which interference goes exactly to zero, though it may well be  
>negligible and perhaps even undetectable. Note that even measuring a small  
>change in noise level (e.g., background noise plus a very weak SS signal)  
>is itself tricky because of the fluctuations of the background noise  
>signal. Measuring smaller and smaller changes in noise level require  
>longer and longer measurement averaging times.  
>  
>>Regarding acquisition in a doppler environment, this may not be the  
>>ferocious problem you think. If you plot despread power on a 3-D graph\*  
>  
>Depends on the SNR. If you have lots of excess power, you can acquire  
>a DSSS signal with a relatively wide filter after the despreaders, wide  
>enough to accomodate the max expected doppler shift. If you don't have  
>a lot of signal power, though, you will have to use a narrow filter  
>and sweep it through the max range of doppler shift at the same time  
>you are sweeping the local code generator through its possible time  
>offsets. This increases the dimension of the search space, which can

>greatly increase the acquisition time.  
>  
>Phil  
>  
>  
>  
>

---

## 42. 1997 ARRL and TAPR DCC Reminder

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Tue, 30 Sep 1997 15:15:53 -0500  
To: " TAPR/AMSAT DSP "<dsp@tapr.org>, " Spread Spectrum "<ss@tapr.org>,  
"HF SIG list mailing"<hfsig@tapr.org>,  
"NETSIG list mailing"<netsig@tapr.org>,  
"TAPR APRS SIG"<aprssig@tapr.org>, " MIC-E Beta "<mic-e@tapr.org>,  
" tacgps "<tacgps@tapr.org>  
Message-ID: <v03110717b0570c981bd4@[208.134.134.40]>  
Rendered body type: text/plain

Don't forget that the 16th Annual ARRL and TAPR Digital Communications Conference is in just a few days!

It is not too late to make the conference. Registration is already at a high and we expect a really great conference! Hope to see you in Baltimore.

1997 ARRL and TAPR Digital Communications Conference  
October 10-12, 1997  
Baltimore, Maryland (minutes from BWI airport)

Main Web Page -- <http://www.tapr.org/dcc>  
Tentative Schedule -- <http://www.tapr.org/tapr/html/dcc97schedule.html>  
Proceedings Abstracts -- <http://www.tapr.org/tapr/html/cnc16.html>  
Local Attractions -- [http://www.tapr.org/tapr/html/dcc97\\_attractions.html](http://www.tapr.org/tapr/html/dcc97_attractions.html)

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The 1997 ARRL and TAPR Digital Communications Conference will be held on October 10-12, 1997 in Baltimore, Maryland. This year's conference location is just minutes away from the BWI Airport.

What can you expect during the 1997 ARRL and TAPR Digital Communications Conference ?

- \* A full day of papers and breakouts on Saturday for the beginner to the advanced amateur digital enthusiast.

- \* Three workshops
  - o Friday (1pm - 8pm) - APRS Symposium (<http://www.aprs.net/dcc/>)
  - o Friday (4pm - 8pm) - Seminar on RF Basics for Computer Weenies
  - o Sunday (8:30am - 1:30pm) - Seminar on Spread Spectrum system Design and Theory

- \* The second annual Student paper session.

- \* A banquet with a Special Guest Speaker Yutaka Sakurai, JF1LZQ who is Vice President of Japan's Packet Radio User's Group (PRUG). His talk is entitled, "Japan's PRUG: A look at its history and a view to the future". He will discuss the history of the PRUG from its early beginnings in the mid-80's and track its development to today. He will also discuss some of PRUG's current projects and its goals for the future.

- \* SIGs (Special Interest Groups) on Saturday following the banquet.

- \* Informal get-togethers throughout the weekend.

- \* TAPR Membership Meeting

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Special Symposiums/Seminars

In addition to the presentation of papers on Saturday, three symposiums/seminars will be held before and after the conference. These sessions are provided to allow those with additional time and interest to make the most of the Digital Communications Conference. For those that might have interest in just a symposium or seminar, registration for the conference is not necessary to register and attend one or more of the symposiums and seminars. This allows maximum flexibility for those that might want to participate during the Digital Communications Conference, but

do not have an entire weekend to devote to the event.

A full day symposium on Friday covering APRS will be conducted by Bob Bruninga, WB4APR (father of APRS) Keith Sproul, WU2Z, Mark Sproul, KB2ICI (developers of Mac and Windows APRS), Steve Dimse, K4HG (developer of javAPRS), and other nationally known APRS leaders. Join this group for the afternoon and evening for in depth discussions and presentations on the current and future status of APRS. This is an unique opportunity to gain insight into this fast growing digital aspect of amateur operations that combines computers, packet radio, and GPS (Global Positioning System). See <http://www.aprs.net/dcc/> for schedule.

Starting late Friday afternoon a half-day seminar entitled "RF Basics for Computer Weenies: Helping the RF-challenged get the most out of the new high-speed wireless toys" presented by Mike Cheponis, K3MC. The seminar will focus on such topic as basic antenna types and their characteristics, comparison of feedlines and connector types, propagation basics (calculation of path loss, multipath effects, fresnel zones, etc), weatherproofing, lightning protection, filters, basic RF measurements, and other issues related to maintaining radio equipment on the UHF/SHF bands. This seminar will be starting late enough in the afternoon on Friday to allow those flying on that day to attend the seminar.

On Sunday morning, Dewayne Hendricks, WA8DZP, Phil Karn, KA9Q, and Tom McDermott, N5EG, will conduct a seminar focusing on "Spread Spectrum System Design and Theory." All three presenters are well known for their work in various areas of amateur digital communications and this 5 hour seminar should be an excellent opportunity to learn about the design and theory of spread spectrum systems. This seminar is a follow up to the past two seminars of PCS technology by Dewayne with a new focus on system design.

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#### Airports

- \* The closest airport is Balitmore/Washington International (BWI)
- \* For those flying internationally or located on the East coast, check flights into
  - o Dulles International or
  - o Washington National Airport
- \* Bus/rail service from either Dulles or Washington to BWI is available, but be sure to check on this before arriving.

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#### Hotel Information

Conference presentations, meetings, and workshops will be held at the Holiday Inn BWI Airport. DCC special rooms rates are \$89 per night. When making reservations with the hotel, be sure to indicate you are attending the ARRL and TAPR DCC conference. The hotel provides transportation to and from BWI Airport, Amtrak/MARC rail station, and the local Baltimore Light Rail. You should contact the hotel to arrange transportation.

Holiday Inn BWI Airport (conference hotel)  
890 Elkrige Landing Rd, Linthicum, MD, 21090  
(410) 859-8400, Fax (410) 684-6778

3912.00N and 07641.34W

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#### Directions to Conference

Coming from Baltimore Metro Area:  
Follow MD-295 SOUTH towards BWI airport  
Take W. NURSERY Rd exit  
LEFT at the list at the end of the exit  
RIGHT at the 3rd light, WINERSON Rd  
LEFT at the 1st light, ELKRIDGE LANDING Rd  
Holiday Inn BWI will be 1/2 mile on right.

Coming from Annapolis:  
Follow I-97 NORTH/RT. 3 NORTH  
Take DORSEY Rd Exit (rt 176 West)  
RIGHT onto AVIATION Blvd (Rt 162)  
Pass BWI Satellite parking  
Follow signs to BWI Airport  
RIGHT onto ELKRIDGE LANDING Rd

Holiday Inn BWI will be 1/2 mile on left.

Coming from Washington, DC:  
Follow I-95 NORTH or MD-295 NORTH towards Baltimore  
Take I-195 EAST towards BWI airport  
Take EXIT 1A (Rt. 170 North)  
LEFT at 2nd light, ELKRIDGE LANDING Rd  
Holiday Inn BWI will be 1/2 mile on left.

Coming from the North:  
Follow I-95 SOUTH or NEW JERSEY TURNPIKE SOUTH to I-95 South  
Take I-95 SOUTH to I-195 EAST/AIRPORT to  
Rt. 170 NORTH LINTHICUM to 2nd light,  
turn left onto ELKRIDGE LANDING Rd  
Holiday Inn BWI will be 1 mile on left.

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Local Repeater Talk-In  
Maryland FM Association WA3DZD repeater network has given premission to use  
their system for the talk-in on Saturday morning, October 11, 1997 and for  
use during the conference weekend. The frequicies are:

- \* 146.76 out, 146.16 in
- \* 224.76 out, 223.16 in
- \* 444.00 out, 449.00 in

The talk-in station will be using the call sign W3NSA.

Many thanks to the Maryland FM Association.

-----  
Tucson Amateur Packet Radio  
8987-309 E Tanque Verde Rd #337 \* Tucson, Az \* 85749-9399 \* 940-383-0000  
-----  
e-mail: [tapr@tapr.org](mailto:tapr@tapr.org) ftp: [ftp.tapr.org](ftp://ftp.tapr.org) web: <http://www.tapr.org/>  
-----

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## 43. Lucent Drops WaveLAN Prices

From: Greg Jones <[wd5ivd@tapr.org](mailto:wd5ivd@tapr.org)>  
Date: Tue, 30 Sep 1997 15:17:42 -0500  
To: " Spread Spectrum "<[ss@tapr.org](mailto:ss@tapr.org)>  
Message-ID: <[v03110719b0570ed0a168@208.134.134.40](mailto:v03110719b0570ed0a168@208.134.134.40)>  
Rendered body type: text/plain

### Lucent Drops WaveLAN Prices

Lucent

09/30/97 Citing savings achieved through lower unit costs and manufacturing efficiencies, Lucent announced price reductions for key components of its WaveLAN, wireless local area network (LAN), family of products. Lucent said it is passing the savings to customers by reducing the Manufacturers Reference Prices (MRP) of the WaveLAN/PCMCIA card for mobile computers from \$695 to \$495 and the WaveLAN/AT card for desktop computers from \$695 to \$545. In addition, the company is offering a 3-year (36 month) limited warranty for its internal WaveLAN network interface cards (NICs) and external antenna modules (EAMs) that are used in wireless LAN applications.

MURRAY HILL, N.J., Sept. 30 /PRNewswire/ -- Lucent Technologies (NYSE: LU), a leader in wireless local area networking, today announced price reductions for key components of its WaveLAN(R) family of products which make the devices the most affordable network interface cards (NICs) in their performance class.

Citing savings achieved through lower unit costs and manufacturing efficiencies, Lucent said it is passing the savings to customers by reducing the Manufacturers Reference Prices (MRP) of the WaveLAN/PCMCIA card for mobile computers from \$695 to \$495 and the WaveLAN/AT card for desktop computers from \$695 to \$545.

WaveLAN NICs are easily installed into desktop and portable computers and allow them to communicate with each other or with a central access point, WavePOINT II(TM), that acts as a wireless/wired bridge. Modular in design, WavePOINT II utilizes PCMCIA radio cards. The lower prices for the PCMCIA cards also reduces the cost of a complete WaveLAN installation. An External

Antenna Module (EAM) enables WaveLAN wireless bridges to be outfitted with a variety of different third-party antenna options.

In addition to the price reductions, Lucent is now offering a three-year (36 month) limited warranty for its internal WaveLAN NICs and EAMs that are used in wireless local area network (LAN) applications. This three year guarantee, including parts and labor, is the longest warranty in the wireless LAN industry for ISA and PCMCIA NICs. Currently, most other manufacturers offer only a one year warranty on their wireless products, access points and NICs.

According to Craig J. Mathias, a principal with the advisory firm Farpoint Group, "Lucent's new price structure on their NIC cards, combined with their three-year warranty, should greatly accelerate the acceptance of wireless networks by systems designers, integrators and network managers."

Andre van Hees, WaveLAN director of operations, attributed the cost reduction to several factors. "We have decreased costs, improved manufacturing efficiency and maintained quality by moving to modular production. Our entire product line is now utilizing the same basic modular PCMCIA-sized radio which reduces component and production costs, while at the same time minimizing our finished goods inventory allowing us to be more flexible in meeting customer demands. Finally, as we have ramped up our shipping volumes, manufacturing overhead has decreased."

Lucent Technologies' WaveLAN group provides wireless LAN solutions for organizations that have the need for flexibility and mobility in their network environment. In addition to NICs, the family of products includes the WavePOINT II(TM) access point for Wireless-to-Ethernet bridging, WaveMANAGER Software for easy control and monitoring of enterprise wide networks, and WaveMODEM wireless modem for OEM products.

More on Lucent Technologies

With installations in over 50 countries, Lucent Technologies is the market leader in wireless LANs. Through its chairmanships in the IEEE 802.11 and ETSI HiperLAN committees, and its partnership with Bell Labs, Lucent Technologies is also a leader in the development of wireless LAN standards. To date, Lucent holds a total of 20 patents on high speed wireless LAN technology.

The WaveLAN family of products is sold world-wide through OEMs and through a network of VARs and distributors. For more WaveLAN information visit our web site at [www.wavelan.com](http://www.wavelan.com). or call 1-800-WAVELAN.

Lucent Technologies (NYSE: LU) designs, builds, and delivers a wide range of public and private networks, communications systems and software, consumer and business telephone systems and microelectronics components. Bell Laboratories is the research and development arm of the company. For more information about Lucent Technologies, headquartered at Murray Hill, N.J., visit our website at <http://www.lucent.com>.

SOURCE Lucent Technologies

-0- 09/30/97

/CONTACT: Mark Shapiro of Davis-Marrin Communications, 619-573-0736 or [dmc@cts.com](mailto:dmc@cts.com); or Sam Gronner of Lucent Technologies, 973-386-5065, or home, 201-461-7864, or [samgronner@lucent.com](mailto:samgronner@lucent.com)

/Web site: <http://www.lucent.com> <http://www.wavelan.com>

(LU)

CO: Lucent Technologies ST: New Jersey IN: CPR TLS SU: PDT

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## 44. Lucent Drops WaveLAN Prices

From: Dewayne Hendricks <[dewayne@warpspeed.com](mailto:dewayne@warpspeed.com)>  
Date: Tue, 30 Sep 1997 13:02:00 -0700  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <[v03110737b0570abfae40@192.168.1.3](mailto:v03110737b0570abfae40@192.168.1.3)>  
Rendered body type: text/plain

Given the general interest in the past regarding the WaveLAN product, I thought I'd post this press release to the list.

-- Dewayne WA8DZP

## Lucent Drops WaveLAN Prices

### Lucent

09/30/97 Citing savings achieved through lower unit costs and manufacturing efficiencies, Lucent announced price reductions for key components of its WaveLAN, wireless local area network (LAN), family of products. Lucent said it is passing the savings to customers by reducing the Manufacturers Reference Prices (MRP) of the WaveLAN/PCMCIA card for mobile computers from \$695 to \$495 and the WaveLAN/AT card for desktop computers from \$695 to \$545. In addition, the company is offering a 3-year (36 month) limited warranty for its internal WaveLAN network interface cards (NICs) and external antenna modules (EAMs) that are used in wireless LAN applications.

MURRAY HILL, N.J., Sept. 30 /PRNewswire/ -- Lucent Technologies (NYSE: LU), a leader in wireless local area networking, today announced price reductions for key components of its WaveLAN(R) family of products which make the devices the most affordable network interface cards (NICs) in their performance class.

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WaveLAN NICs are easily installed into desktop and portable computers and allow them to communicate with each other or with a central access point, WavePOINT II(TM), that acts as a wireless/wired bridge. Modular in design, WavePOINT II utilizes PCMCIA radio cards. The lower prices for the PCMCIA cards also reduces the cost of a complete WaveLAN installation. An External Antenna Module (EAM) enables WaveLAN wireless bridges to be outfitted with a variety of different third-party antenna options.

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According to Craig J. Mathias, a principal with the advisory firm Farpoint Group, "Lucent's new price structure on their NIC cards, combined with their three-year warranty, should greatly accelerate the acceptance of wireless networks by systems designers, integrators and network managers."

Andre van Hees, WaveLAN director of operations, attributed the cost reduction to several factors. "We have decreased costs, improved manufacturing efficiency and maintained quality by moving to modular production. Our entire product line is now utilizing the same basic modular PCMCIA-sized radio which reduces component and production costs, while at the same time minimizing our finished goods inventory allowing us to be more flexible in meeting customer demands. Finally, as we have ramped up our shipping volumes, manufacturing overhead has decreased."

Lucent Technologies' WaveLAN group provides wireless LAN solutions for organizations that have the need for flexibility and mobility in their network environment. In addition to NICs, the family of products includes the WavePOINT II(TM) access point for Wireless-to-Ethernet bridging, WaveMANAGER Software for easy control and monitoring of enterprise wide networks, and WaveMODEM wireless modem for OEM products.

### More on Lucent Technologies

With installations in over 50 countries, Lucent Technologies is the market leader in wireless LANs. Through its chairmanships in the IEEE 802.11 and ETSI HiperLAN committees, and its partnership with Bell Labs, Lucent Technologies is also a leader in the development of wireless LAN standards. To date, Lucent holds a total of 20 patents on high speed wireless LAN technology.

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Lucent Technologies (NYSE: LU) designs, builds, and delivers a wide range

of public and private networks, communications systems and software, consumer and business telephone systems and microelectronics components. Bell Laboratories is the research and development arm of the company. For more information about Lucent Technologies, headquartered at Murray Hill, N.J., visit our website at <http://www.lucent.com>.

SOURCE Lucent Technologies

-0- 09/30/97

/CONTACT: Mark Shapiro of Davis-Marrin Communications, 619-573-0736 or [dmc@cts.com](mailto:dmc@cts.com); or Sam Gronner of Lucent Technologies, 973-386-5065, or home, 201-461-7864, or [samgronner@lucent.com](mailto:samgronner@lucent.com)

/Web site: <http://www.lucent.com> <http://www.wavelan.com>

(LU)

C0: Lucent Technologies ST: New Jersey IN: CPR TLS SU: PDT

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#### 45. Re: [SS:1736] 1997 ARRL and TAPR DCC Reminder

From: [RLANIER@mailb.harris.com](mailto:RLANIER@mailb.harris.com) (RLANIER)  
Date: Tue, 30 Sep 1997 18:32:01 -0400  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <4317e5e0@mailb.harris.com>  
Rendered body type: text/plain

Since I can't make the conference, will this material be available? It would be helpful if the the talks could be available in a audio format as well, such as RealAudio. Or possibly notes.

I would really like to here what they have to say. I can't break from work right now - I have an ASIC due in December!

Tony KE4ATO

---

Reply Separator

Subject: [SS:1736] 1997 ARRL and TAPR DCC Reminder  
Author: [ss@tapr.org](mailto:ss@tapr.org) at smtp  
Date: 9/30/97 3:45 PM

On Sunday morning, Dwayne Hendricks, WA8DZP, Phil Karn, KA9Q, and Tom McDermott, N5EG, will conduct a seminar focusing on "Spread Spectrum System Design and Theory." All three presenters are well known for their work in various areas of amateur digital communications and this 5 hour seminar should be an excellent opportunity to learn about the design and theory of spread spectrum systems. This seminar is a follow up to the past two seminars of PCS technology by Dwayne with a new focus on system design.

---

#### 46. Re: [SS:1739] Re: 1997 ARRL and TAPR DCC Reminder

From: "Greg Jones, WD5IVD" <[wd5ivd@tapr.org](mailto:wd5ivd@tapr.org)>  
Date: Tue, 30 Sep 1997 19:05:30 -0500  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <[v0311071eb05743f01fdf@208.134.134.40](mailto:v0311071eb05743f01fdf@208.134.134.40)>  
Rendered body type: text/plain

I am doing up a web page now covering the 900MHz FHSS radio that the paper and part of the Sunday seminar will produce. If we the audio record from the session is good that will be made available as well.

I have all the audio from the Dayton presentation, but the system I took messed up somehow and a lot of the audio doesn't sound very good when encoded. I have been working on that while I can...but hopefully the system will not have such problems at the DCC.

Cheers - Greg

> Since I can't make the conference, will this material be available? It  
> would be helpful if the the talks could be available in a audio format  
> as well, such as RealAudio. Or possibly notes.  
>  
> I would really like to here what they have to say. I can't break from  
> work right now - I have an ASIC due in December!  
>  
> Tony KE4ATO  
>



>  
> \_\_\_\_\_ Reply Separator  
>  
>Subject: [SS:1736] 1997 ARRL and TAPR DCC Reminder  
>Author: ss@tapr.org at smtp  
>Date: 9/30/97 3:45 PM  
>  
>  
>On Sunday morning, Dewayne Hendricks, WA8DZP, Phil Karn, KA9Q, and Tom  
>McDermott, N5EG, will conduct a seminar focusing on "Spread Spectrum System  
>Design and Theory." All three presenters are well known for their work in  
>various areas of amateur digital communications and this 5 hour seminar  
>should be an excellent opportunity to learn about the design and theory of  
>spread spectrum systems. This seminar is a follow up to the past two  
>seminars of PCS technology by Dewayne with a new focus on system design.

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>

---

## 47. PANSAT operations

From: aa5mt@gate.kc5aug.ampr.org  
Date: Tue, 30 Sep 97 22:32:07 CDT  
To: ss@tapr.org  
Message-ID: <45484@gate.kc5aug.ampr.org>  
Rendered body type: text/plain

I read, with interest, the article by John Magliacane in the July/August issue of Satellite Times. I was not aware that the PANSAT was so close to being completed. I talked with one of the researchers in the navy a couple of years ago about the project and the article was the first I've heard since then.

Can anyone give me the specifications required for the spreading sequences, expected signal strength, etc.? I would like to consider building a station for operation during the PANSAT mission. Since the navy was kind enough to park right in the middle of the 70cm band, we should use it --- or lose it.

73,  
Tom Stone

---

# October 1997

Original source file: ss.9710

Source: [http://ftp.tapr.org/tapr\\_history/SIG\\_Archives/spread-spectrum-sig/mail\\_archive/ss.9710](http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9710)

## 1. Re: [SS:1740] Re: 1997 ARRL and TAPR DCC Reminder

From: RLANIER@mailb.harris.com (RLANIER)  
Date: Wed, 1 Oct 1997 08:48:02 -0400  
To: ss@tapr.org  
Message-ID: <432463e0@mailb.harris.com>  
Rendered body type: text/plain

Cool

Tony

---

Reply Separator

Subject: [SS:1740] Re: 1997 ARRL and TAPR DCC Reminder  
Author: ss@tapr.org at smtp  
Date: 9/30/97 7:14 PM

I am doing up a web page now covering the 900MHz FHSS radio that the paper and part of the Sunday seminar will produce. If we the audio record from the session is good that will be made available as well.

I have all the audio from the Dayton presentation, but the system I took messed up somehow and a lot of the audio doesn't sound very good when encoded. I have been working on that while I can...but hopefully the system will not have such problems at the DCC.

Cheers - Greg

> Since I can't make the conference, will this material be available? It  
> would be helpful if the the talks could be available in a audio format  
> as well, such as RealAudio. Or possibly notes.  
>  
> I would really like to here what they have to say. I can't break from  
> work right now - I have an ASIC due in December!  
>  
> Tony KE4AT0

---

## 2. ARRL and TAPR DCC

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Wed, 1 Oct 1997 13:36:02 -0500  
To: " Spread Spectrum " <ss@tapr.org>  
Message-ID: <v03110731b058472f120f@[208.134.134.40]>  
Rendered body type: text/plain

If you can make the DCC this year, it should be an excellent time to meet and discuss potential and ongoing SS activities. Besides the indepth technical seminar on Sunday conducted by Dewayne Hendricks, Tom McDermott, and Phil Karn, there are will be several other SS papers and sessions happening.

Hope to see everyone at this year's DCC in Baltimore.

<http://www.tapr.org/dcc>

Cheers - Greg, WD5IVD

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>

---

## 3. ethernet radio link implementation

From: Chris <critta66@shadow.net>  
Date: Thu, 02 Oct 1997 21:33:27 -0400  
To: ss@tapr.org  
Message-ID: <3.0.32.19971002213316.007d2790@shadow.net>  
Rendered body type: text/plain

Hello,

Im looking for an easy way to set up a 2.3 ghz or 10 ghz high speed

ethernet radio link. I've seen the plans in the 1993 arrl book for the 10ghz link but i think it was a little too old. If anyone knows where i can find information on building such a link or know someone who has made something like this please reply..

thanks  
KF4MYN

---

#### 4. Re: [SS:1744] ethernet radio link implementation

From: Lawrence Gruber <lawrence@javanet.com>  
Date: Fri, 03 Oct 1997 02:06:40 -0400  
To: ss@tapr.org  
Cc: critta66@shadow.net  
Message-ID: <3.0.3.32.19971003020640.006b40fc@javanet.com>  
Rendered body type: text/plain

>Im looking for an easy way to set up a 2.3 ghz or 10 ghz high speed  
>ethernet radio link. I've seen the plans in the 1993 arrl book for the  
>10ghz link but i think it was a little too old. If anyone knows where i  
>can find information on building such a link or know someone who has made  
>something like this please reply..  
>  
>thanks  
>KF4MYN

Check out Glenn Elmore's: W6GN's Higher Speed Packet Page at:

<http://www.tapr.org/~n6gn/>

Also,

The Slovenian Packet Radio Network Page at:

<http://lois.kud-fp.si/hamradio/packet.html>

Matjaz Vidmar's (S53MV) article's (23 & 12 cm./1.22 Mbps)  
was published in 15th ARRL & TAPR Digital Comm. Conference,  
1966, and is available from TAPR. It also appeared in VHF  
Communications, No. 28 (& 29 for the 23 cm. article) 1966.

Good Luck!

Larry (Lawrence) Gruber  
Medford, Massachusetts USA  
lawrence@javanet.com

---

#### 5. external switching for ISM SS products

From: Dave Koberstein <davek@komacke.com>  
Date: Thu, 02 Oct 1997 20:52:01 -0700  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19971002205201.006b9d50@mailhost>  
Rendered body type: text/plain

I recently read about a useful device for those employing OTS ISM SS products in the 2.4 GHz band. The M/A Com SW-356 SPDT switch takes a 5V-DC control signal on the RF feed line. One of these devices could be used as part of a circuit switching in/out a power amp and/or pre-amp.

The switching latency is on the order of 20 ns, which should be fast enough for most radios out there. I would imagine an RF detector could be used to create the control signal. The power capacity is rated at 1W (1-dB compression) and isolation is around 15 dB. Insertion loss is about 1.2 dB.

Don't know how much these things cost. Hope they aren't too expensive. I imagine they'll be useful for those that like the building-block approach to microwave.

On another topic, if you are interested in using the Proxim RangeLAN2 under linux, check my web site for a driver: <http://www.komacke.com>. Also, Proxim can configure their cards to operate in the ham 2.4 band by special request. Send them a message via their web site.

Davek

---

Dave Koberstein  
keep in touch: davek@komacke.com / <http://www.komacke.com>  
work: davek@proxim.com / <http://www.proxim.com>

ham internet: n9dk@n9dk.ampr.org [44.4.12.172]  
(ax.25/PBBS: n9dk@w6yx.#nocal.ca.usa.noam)

---

## 6. AMRAD meeting Thur of DCC

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Tue, 7 Oct 1997 09:59:17 -0500  
To: "TAPR-BB list mailing" <tapr-bb@tapr.org>, "tacgps" <tacgps@tapr.org>,  
"Spread Spectrum" <ss@tapr.org>,  
"NETSIG list mailing" <netsig@tapr.org>,  
"HF SIG list mailing" <hfsig@tapr.org>  
Message-ID: <v03110708b05ffe1db177@[208.134.134.40]>  
Rendered body type: text/plain

Participants in the 1997 Digital Communications Conference are invited to attend the regular monthly meeting of the Amateur Radio Research and Development club (AMRAD), Thursday evening at 7:30 PM in the lower meeting room of the Dolley Madison Branch Library, McLean, Virginia. The library is located near the intersection of VA Rte 123 (Dolley Madison Blvd) and Old Dominion Drive.

This month's meeting is devoted to the "dc" band of anywhere from 73 kHz to 190 kHz. ARRL has stated an amateur requirement for access to a low-frequency band and NTIA has accepted the justification. There are still many steps needed to acquire the band but interest is building among experimenters. American LF advocates are watching activities in Europe where CEPT is planning a "harmonised" band around 143 kHz.

Bob Laney will be one of the (informal) speakers for this Thursdays meeting. He has a wonderful LF set-up and is even a fan of amateur seismology. He'll be bringing photos and share his experiences in the LF arena.

---

## 7. Re: [SS:1747] AMRAD meeting Thur of DCC

From: Dirk Koopman <djk@tobit.co.uk>  
Date: Tue, 7 Oct 1997 17:16:58 +0100 (BST)  
To: ss@tapr.org  
Message-ID: <Pine.LNX.3.95.971007171611.10238d-100000@dirku.tobit.co.uk>  
Rendered body type: text/plain

On Tue, 7 Oct 1997, Greg Jones, WD5IVD wrote:

> This month's meeting is devoted to the "dc" band of anywhere from 73 kHz to  
> 190 kHz. ARRL has stated an amateur requirement for access to a  
> low-frequency band and NTIA has accepted the justification. There are still  
> many steps needed to acquire the band but interest is building among  
> experimenters. American LF advocates are watching activities in Europe  
> where CEPT is planning a "harmonised" band around 143 kHz.  
>

It has been announced as the "136Khz" band - width unknown as yet.

--

Dirk-Jan Koopman      Tel/Fax: +44 1362 696076 Mobile: +44 973 333806  
Computer Consultant   Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU  
"The typewriting machine, when played with expression, is no more annoying than  
the piano when played by a sister or near relation." --Oscar Wilde

---

## 8. Publication info, pse

From: Grzegorz Siwicki <greg@tu.koszalin.pl>  
Date: Sun, 12 Oct 1997 14:52:45 +0200 (MET DST)  
To: ss@tapr.org  
Message-ID: <Pine.SOL.3.91.971012144717.11428A-100000@lew.tu.koszalin.pl>  
Rendered body type: text/plain

Hello,

Does anybody know the authors and the publishing house of "Digital Satellite Communications" ?

Thank you for any information.

73 de Greg SP1RKV  
Koszalin, Poland  
greg@tu.koszalin.pl

---

## 9. Re: Publication info, pse

From: The Whiting Household <rwhiting@winternet.com>  
Date: Sun, 12 Oct 1997 14:14:50 -0500

To: ss@tapr.org  
Message-ID: <3.0.1.32.19971012141450.0069d5c8@mail.winterneta.com>  
Rendered body type: text/plain

Greg,

I checked out Amazon Bookstore (URL [www.amazon.com](http://www.amazon.com)) and did a search on "Digital Satellite Communications." It returned a number of similar titles. One was Ha, Tri T. (1990), "Digital Satellite Communications," NY: McGraw-Hill. But, it was listed as out of print! I suggest you go to the URL and check out the titles and the descriptions of the books.

Regards/ Rick

At 08:07 10/12/97 -0500, you wrote:

>Hello,

>

>Does anybody know the authors and the publishing house of "Digital Satellite Communications" ?

>

>Thank you for any information.

>

>73 de Greg SP1RKV

>Koszalin, Poland

>greg@tu.koszalin.pl

>

```
-----
| Richard A. (Rick) Whiting      Home Phone: +1 612 550-1213 |
| RF Engineer, AirTouch Cellular Work Phone: +1 612 595-5065 |
| 5780 Rosewood Ln. N.         Fax:          +1 612 595-5108 |
| Plymouth, MN 55442-1411      E-Mail: rwhiting@winterneta.com |
-----
```

## 10. TAPR SS Alpha Boards

From: Darryl Smith <vk2tds@ozemail.com.au>  
Date: Sun, 12 Oct 1997 17:34:24 -0400  
To: ss@tapr.org  
Message-ID: <34414260.A7B71941@ozemail.com.au>  
Rendered body type: text/plain

Hi There.

I just had the opportunity to see the unpopulated prototype of the Spread Spectrum Transmitter TAPR is working on. I have the following comments. These comments are based partly on the paper I presented to the TNC.

I love the Idea of the board. Basically though I think that the cost will be quite high for the whole board. So I have a method for reducing the total cost of the SS Transmitting System. Basically as the quantities go up, dollars go down.

The modification I would like to see would be to have the following pins available on headers on the board.

- 3 SYNCH PORTS (All except Ethernet) [Including the ones connected to the viterbi encoder]
- 2 ASYNCH Ports
- 1 BDM port.

This would cost about a fraction of a cent to add to the circuit board.

Secondly, I would then like to see TAPR sell this board with memory, Ethernet, 68360 and headers; basically without the viterbi encoder, and without all the I&Q encoder and decoder stuff.

This would give me a TNC that I could interface to at little cost and easally create the ultimate TNC, with 3 radio ports and 2 modem/serial ports; with ethernet ports.

When I suggested this at the SS presentation at the DCC the comment was made that maybe I should design my own board. I can do that, but why should I? The board is 99% of what I want. TAPR have funded it. VERY FEW people I know would purchase a board like this, when at \$349 I can purchase a similar system commercially. BUT with a partially populated board, for well under \$200 I am sure that the 3+2 TNC with ethernet would be buildable.

OK - Double the inventory for the partially populated board? They are actually going to sell more than the SS full model.

Anyway, do not discard these ideas. I am a member. These ideas are also held by

many other members.

Darryl  
VK2TDS  
[Attachment: smime.p7s; application/x-pkcs7-signature; 4,258 bytes]

---

## 11. Re: [SS:1751] TAPR SS Alpha Boards

From: Bob Lorenzini <hwm@netcom.com>  
Date: Sun, 12 Oct 1997 18:42:20 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <Pine.LNX.3.95.971012183856.103A-100000@mm.wd6dod.ampr.org>  
Rendered body type: text/plain

Where can the rest of us see the details on these boards or have I missed something. I'am begining to think that those of us on this list are the last to know about what is going on.

Bob - wd6dod

---

## 12. Re: [SS:1752] Re: TAPR SS Alpha Boards

From: Steve Dimse K4HG <k4hg@tapr.org>  
Date: Sun, 12 Oct 97 22:07:14 -0400  
To: <ss@tapr.org>  
Message-ID: <199710130206.VAA06039@tapr.org>  
Rendered body type: text/plain

On 10/12/97 9:43 PM Bob Lorenzini (hwm@netcom.com) wrote:

> Where can the rest of us see the details on these boards or have I  
> missed something. I'am begining to think that those of us on this  
> list are the last to know about what is going on.  
>  
Should have been at DCC! In any case, release of this radio is a very long time away, upwards of a year. All that was shown at DCC was unpopulated first rev circuit boards. Lots of details about the radio was released, and it sounds very exciting, but we all will have to wait a while.

Steve K4HG

---

## 13. Re: [SS:1752] Re: TAPR SS Alpha Boards

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Sun, 12 Oct 1997 22:40:02 -0500  
To: ss@tapr.org  
Message-ID: <v0311070ab0673dad49b[206.133.9.87]>  
Rendered body type: text/plain

Hi gang.

As many of you might not know -- a good many of us have been attending the ARRL/TAPR 1997 DCC in Baltimore this weekend. It was great to get to visit with the folks on this list that got to attend. If you didn't make this one -- then be sure to make next year's conference (location will be worked on by the committee in the next several weeks). One of the high points of the conference was the banquet talk by the VP of the Japan PRUG (Packet Radio Users Group). They are doing some really exciting things and it was a great opportunity to listen, ask questions, and share information about their work.

One of the papers presented was on the TAPR 900Mhz FHSS radio project which has been mentioned in the last 2 PSRs. (Bob -- do you get to read the PSR ?) The full paper will be printed in the next PSR or you can get it and all the other papers by getting the proceedings from TAPR or the ARRL.

The conference was one of the best ever! We had over 150 people at the conference and lots of major stuff was accomplished and presented. The SS Design and Theory seminar on Sunday was hot stuff! Over 80 people attened and the APRS National Symposium on Friday had a very large turnout.

If you have the chance, make plans to attend next years conference.

One of the papers presented at conference was the TAPR 900Mhz FHSS radio project. I'll be creating a web page concerning the project now that we have some information to make available. The presentations and the realaudio segments on the site. A must note -- please do not e-mail the team. If you have questions, comments, or concerns, e-mail me. The team from the beginning has asked for a certain amount of quite and room in which to work. The TAPR BoD agreed with this request when we voted funding for the project at the Dayton Board meeting, which was reported in the PSR

under the minutes of the meeting.

Anyway, as it stands right now -- the boards that are mentioned are the \_\_PROTOTYPE\_\_ ver .00001 boards. These came from the board shop just this last wed and the team saw for the first time Friday after they got FedExed to the conference. There will be months of work getting the design further down the road and tested.

Now -- as to Darryl's comments. To understand what Darryl is talking about you'll need to read both the papers -- what the 900Mhz radio team wrote and the one that Darryl submitted and presented on (that of next generation TNCs) -- this will explain what Darryl is looking for and why the interest. If Darryl wants to submit a proposal to TAPR concerning what he has in mind and what he wants to develop and if one of the board sets can be spared during the prototype phase of the project -- I am sure TAPR and the project team would consider his request.

I am not sure why Darryl just didn't talk to me at the conference after the presentation and we could probably have worked something out then and there with most of the team around and available -- but that opportunity has been missed now. I look forward to getting a message from Darryl outling what support he might request for R&D as a member of TAPR so that if the project can't handle the request now, we could budget in one extra board set in a future development run and then see what he might be able to deliver from his end with respect to software that might create additional opportunities for TAPR with the project development money being spent.

I am on the road until after the AMSAT conference and don't expect to start putting the various DCC web pages together until then.

Cheers - Greg

> Where can the rest of us see the details on these boards or have I  
> missed something. I'm begining to think that those of us on this  
> list are the last to know about what is going on.  
>  
> Bob - wd6dod

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>

---

## 14. WaveLAN specs

From: Robert Barron <rbarron@pervasive-sw.com>  
Date: Mon, 13 Oct 1997 07:25:03 -0500  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <21D35A9087ACD01186BB00805FFE4A837AC08C@mercury.pervasive-sw.com>  
Rendered body type: text/plain

Can someone point me in the direction of some more technical specifications for the WaveLAN cards? I'd like to know some things like real power output, antenna gain, exact frequency range, etc.

Thanks!

73,

-----  
Robert Barron, KA5WSS   rbarron@pervasive.com  
Pervasive Software

---

## 15. Re: [SS:1755] WaveLAN specs

From: Jeff King <jeff@mich.com>  
Date: Mon, 13 Oct 1997 10:15:59 -0400  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19971013101559.039d7100@mail.mich.com>  
Rendered body type: text/plain

At 07:32 AM 10/13/97 -0500, Robert Barron wrote:  
> Can someone point me in the direction of some more technical  
> specifications

Have you looked at [www.wavelan.com](http://www.wavelan.com) yet?

>for the WaveLAN cards? I'd like to know some things like real power  
>output, antenna gain, exact frequency range, etc.

On the 900mhz product, power output is about 26dbm, the antenna is a  
diversity patch antenna, not much gain and indoor only, so you'll  
likely want to use something else. Its a DSS unit, so I believe it  
covers the entire 902-928 band.

Regards,

```
-----  
| Jeff King      Aero Data Systems |  
| jeff@mich.com  P.O. Box 510895   |  
| (810)471-1787  Livonia, MI 48151  |  
| F(810)471-0279 United States     |  
-----
```

---

## 16. Re: [SS:1754] Re: TAPR SS Alpha Boards

From: Bob Lorenzini <hwm@netcom.com>  
Date: Mon, 13 Oct 1997 07:29:37 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <Pine.LNX.3.95.971013070325.97E-100000@mm.wd6dod.ampr.org>  
Rendered body type: text/plain

On Sun, 12 Oct 1997, Greg Jones, WD5IVD wrote:

> One of the papers presented was on the TAPR 900Mhz FHSS radio project which  
> has been mentioned in the last 2 PSRs. (Bob -- do you get to read the PSR  
> ?) The full paper will be printed in the next PSR or you can get it and  
> all the other papers by getting the proceedings from TAPR or the ARRL.

> realaudio segments on the site. A must note -- please do not e-mail the  
> team. If you have questions, comments, or concerns, e-mail me. The team  
> from the beginning has asked for a certain amount of quiet and room in  
> which to work. The TAPR BoD agreed with this request when we voted funding  
> for the project at the Dayton Board meeting, which was reported in the PSR  
> under the minutes of the meeting.  
>

> Cheers - Greg

Yes Greg I do get the PSR, that is where I first heard about these  
ongoing SS projects that we don't hear about on this list. I thought this  
list was for the exchange of ideas and news about what is happening in SS.  
What makes me and judging from the private e-mail I have received others  
unhappy is to get this information second hand here. I know Greg that you  
have done what you can. I'am unhappy with the TAPR BOD for accepting the  
terms under which these projects are funded. We understand that there  
are developers who want to work without the bickering (such as mine) and  
requests for every feature known to man in their project, however this is  
our money they are spending and I think we have the right to know what  
projects are in active progress. I have no problem with an anonymous team  
working on a project but I do have a problem with secret projects. This is  
my last word on the subject, sorry for the dissention, back to SS.

Bob - wd6dod

---

## 17. RE: 1755] WaveLAN specs

From: Guy Story <GStory@icomply.com>  
Date: Mon, 13 Oct 1997 10:04:42 -0500  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <c=US%a=\_%p=LEW%l=LEW\_PROD51-971013150442Z-5083@lew\_prods1.icomply.com>  
Rendered body type: text/plain

www.lucent.com I forget the exact local but this will get you into the  
area.

>-----  
>From: Robert Barron[SMTP:rbarron@pervasive-sw.com]  
>Sent: Monday, October 13, 1997 7:32 AM  
>To: ss@tapr.org



>Subject: [SS:1755] WaveLAN specs  
>  
>Can someone point me in the direction of some more technical  
>specifications  
>for the WaveLAN cards? I'd like to know some things like real power  
>output, antenna gain, exact frequency range, etc.  
>  
>Thanks!  
>  
>73,  
>  
>-----  
>-----  
>Robert Barron, KA5WSS rbarron@pervasive.com  
>Pervasive Software  
>  
>

---

## 18. Re: [SS:1756] Re: WaveLAN specs

From: bm@lynx.ve3jf.ampr.org  
Date: Wed, 15 Oct 1997 02:35:15 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <199710150235.CAA04760@lynx.ve3jf.ampr.org>  
Rendered body type: text/plain

Jeff King <jeff@mich.com> wrote:  
> At 07:32 AM 10/13/97 -0500, Robert Barron wrote:  
> >Can someone point me in the direction of some more technical  
> >specifications  
>  
> Have you looked at www.wavelan.com yet?  
>  
> >for the WaveLAN cards? I'd like to know some things like real power  
> >output, antenna gain, exact frequency range, etc.  
>  
> On the 900mhz product, power output is about 26dbm, the antenna is a  
> diversity patch antenna, not much gain and indoor only, so you'll  
> likely want to use something else. Its a DSS unit, so I believe it  
> covers the entire 902-928 band.

Sigh... attendees of my DCC paper on propagation know that it's 24 dBm,  
not 26. :-). Actually, I just took a peek at the web site, and they say 23 dBm.  
The nominal bandwidth of WaveLAN is 11 MHz, centered at 915 MHz. The 2.4 GHz  
product has lower power output (15 dBm), and several choices of center  
frequency (up to 8, depending on version). The biggest problem with WaveLAN  
(and other similar products) is the relative deafness of the receiver, which  
seems to suffer from both poor noise figure and hefty modem implementation  
loss - it needs an SNR of around 35 dB to deliver a low BER.

Barry  
>  
>  
>  
>  
> Regards,  
>  
>

> -----  
> | Jeff King Aero Data Systems |  
> | jeff@mich.com P.O. Box 510895 |  
> | (810)471-1787 Livonia, MI 48151 |  
> |F(810)471-0279 United States |  
> -----  
>

--  
Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca  
Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org  
Packet Working Group | Web: http://hydra.carleton.ca

---

## 19. Re: [SS:1757] Re: TAPR SS Alpha Boards

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Tue, 14 Oct 1997 21:51:27 -0500  
To: ss@tapr.org  
Message-ID: <v0311070eb0689a661a37@206.133.8.55>  
Rendered body type: text/plain

Hi Bob.

> Yes Greg I do get the PSR, that is where I first heard about these

>ongoing SS projects that we don't hear about on this list. I thought this  
>list was for the exchange of ideas and news about what is happening in SS.

Glad to hear you read the PSR. We do have members that don't, so just wanted to make sure you knew we had put some things in the PSR...not a lot, but there was some information.

I'll let Barry answer in full the purpose of the list, since he is the list chair. I'll put in my two cents a little later in this message.

Also, thanks for taking the time to let me and others know how you feel about this issue.

>What makes me and judging from the private e-mail I have received others  
>unhappy is to get this information second hand here. I know Greg that you  
>have done what you can. I'am unhappy with the TAPR BOD for accepting the  
>terms under which these projects are funded. We understand that there  
>are developers who want to work without the bickering (such as mine) and  
>requests for every feature known to man in their project, however this is  
>our money they are spending and I think we have the right to know what  
>projects are in active progress. I have no problem with an anonymous team  
>working on a project but I do have a problem with secret projects. This is  
>my last word on the subject, sorry for the dissention, back to SS.

Let me take a minute to explain how project development works within TAPR for those who might not know or have never read before. There are two ways in which projects happen within TAPR. The organization thinks its has something that needs to be done or a group/individual(s) approaches TAPR with a concept. The success rate of projects brought to TAPR are very much higher then projects that we look for people to do that need to be done. The reason should be obvious, the very nature of volunteers. The Wireless Digital Book, TCP/IP book, GPS-20 power, Oncore Power, TAC-2/TOC, MIC-E, DAS (these just in the last two years) have all been brought to TAPR. Some of the ones that have been started by asking to have something done are the METCON-II, AN-93, updated 9600 baud modem, 9600 baud land mobile information, TNC-95, and a few others. These last ones are in various forms of completion or have been cancelled. Many project can be slowed, because of people issues -- things change and time commitment has to be changed. When you are dedicated (married) to a project that was brought to TAPR, then distractions are sometime not a problem -- distractions don't happen. I am sure if we could somehow pay people for their work -- thus breaking the volunteer process -- projects could be much more regularly thought up and executed.

Long intense volunteer projects require a certain dedication to see final completion. Without this dedication, we wouldn't have many of the projects over the years in amateur radio, not just within TAPR. Look at APRS and other areas that a few people devote hours that could never be paid for.

As to the issue of secret projects. I disagree completely, but then I was one of nine people who was responsible for what you see as a problem. This was no secret project. It was reported in the BoD meeting and in the PSR about the project was being funded. If the issue was that you couldn't read about it until now, then that is simple to answer. The issue is that we didn't have anything to publish until this next issue of the PSR, which is already published in the DCC proceedings. If you didn't make the DCC, then the PSR will be your first chance to read about the project. The Board approved money to move forward with the design based on a preliminary design proposal, but that was not of a quality we could publish. This design wasn't really finalized into what we have now until a few weeks ago and we put it into the DCC and now into the next PSR. No money was spent on the project until two design review meetings where held in August/Sept between members of the overview/project mgmt team and the design team. Since progress was very positive, no limitations on the project were imposed and the design continued forward. If the meetings had shown some problem or major issue, then some action would have been taken. While this is a very informal review process, it does yield the necessary results -- that of protecting the future investment by TAPR in a project.

How can a project be secret if you knew about it -- I guess the issue is that you where not satisfied with the amount of information made available. I apologize, if this was the problem, but we didn't really have anything and the design team was not in a position to take time away from the design process to write articles during the period of the last 6 months. The DCC was a different issue, since the deadline was around the time of the reviews and the information could be compiled and made available. You will be able to read all the project shortly when the article is in the PSR and up on the web page. I guess we could have made all this available a few weeks ago, but thinking back now I really wanted to announce all this at

the ARRL and TAPR DCC/TAPR Annual Membership Meeting....a very traditional time to make this type of information available over the last ten years with major TAPR projects. Just in Baltimore instead of Tucson.

I think I have already covered the reasons why the design group wants to be left to design and test until such time as we need to start bringing additional testers into the mix. When that time approaches we will take applications for testing -- although the first few people will have to have unique abilities, lots of time available, and good test equipment at home are available all the times.

If you don't like the design approach, then TAPR is always open to others to approach us with something that we can ask questions about and see if we can help fund something. As an example, Randy Roberts made a proposal, but no one every followed up with a plan to do something with it.

As to the decision of the Board. You vote for the board each year. If you voted for the current board then you have several options available. One, like what you did in your message....let us know that you are unhappy about what we did. We will be aware of this in the future. Two, vote for board members that support your position over the next few years. Three, run for the board to help change things from the inside and spend the countless hours that many of us do each month doing the day to day drudge that makes the organization live -- but doesn't give much time to code, build, test, and all the other things that many of us use to have time to do before joining the board. Four, leave TAPR. I would hope one of the first three options are the most appealing, but I look at the fact that we only have a 10% turnover currently in membership over the last 3 years, which is excellent for any group like TAPR. When membership drops rapidly that is the true indication that the organization has to rethink what it is about and does. People vote every day with their membership renewals and I look at those facts very seriously.

If anyone on this group has something they feels needs to be said to me or the TAPR board, please feel free to drop me a message. These types of correspondence are shared with the board and all the rest of any replies. My e-mail box is open.

Now -- the question becomes, how do we:

1. Educate more people about SS issues ?
2. find some OEM products that we can get without major strings to be made available to the membership while we work on our own development projects.
3. how to get people to be filing more info to the FCC on the subject so that we get rules that are conducive to what we are after.

Anyway, we can all get back to the issues of SS and how we can move forward and get some other stuff on the air now.

Cheers - Greg

-----

Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>

---

## 20. Re: [SS:1759] Re: WaveLAN specs

From: Bernie Doehner <bad@uhf.wireless.net>  
Date: Wed, 15 Oct 1997 00:32:28 -0400 (EDT)  
To: ss@tapr.org  
Message-ID: <Pine.BSF.3.96.971015003055.6133B-100000@uhf.wireless.net>  
Rendered body type: text/plain

> Sigh... attendees of my DCC paper on propagation know that it's 24 dBm,  
> not 26. :-) Actually, I just took a peek at the web site, and they say 23 dBm.  
> The nominal bandwidth of WaveLAN is 11 MHz, centered at 915 MHz. The 2.4 GHz  
> product has lower power output (15 dBm), and several choices of center  
> frequency (up to 8, depending on version). The biggest problem with WaveLAN  
> (and other similar products) is the relative deafness of the receiver, which  
> seems to suffer from both poor noise figure and hefty modem implementation  
> loss - it needs an SNR of around 35 dB to deliver a low BER.  
>  
> Barry

Barry:

Have you ever figured out a correspondence between signal level/noise/quality and REAL SNR? I tried, and found the variance between

adjacent measurements to be too large to make any sense. Maybe I have to average over longer periods of time (I am working with the FreeBSD Wavelan driver, which includes a signal strength cache).

73

Bernie nuls

---

## 21. Re: [SS:1749] Publication info, pse

From: vleveque@earthlink.net  
Date: Tue, 14 Oct 1997 21:57:15 -0700 (PDT)  
To: ss@tapr.org  
Message-ID: <v02140b00b0699baac237@DialupEudora>  
Rendered body type: text/plain

Bruce Elbert might be the authro, and the publishing house Artech

>Hello,  
>  
>Does anybody know the authors and the publishing house of "Digital Satellite  
>Communications" ?  
>  
>Thank you for any information.  
>  
>73 de Greg SP1RKV  
>Koszalin, Poland  
>greg@tu.koszalin.pl

---

## 22. Re: WaveLAN specs

From: Robert Barron <rbarron@pervasive-sw.com>  
Date: Thu, 16 Oct 1997 09:09:40 -0500  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <21D35A9087ACD01186BB00805FFE4A837AC0B1@mercury.pervasive-sw.com>  
Rendered body type: text/plain

Thanks to everyone who posted information about the WaveLAN specs. I'm supposed to speak a little about Spread Spectrum tonight at a club meeting and wanted some more detailed information.

73,

-----  
Robert Barron, KA5WSS   rbarron@pervasive.com  
Pervasive Software

---

## 23. Re: [SS:1761] Re: WaveLAN specs

From: Jeff King <jeff@mich.com>  
Date: Thu, 16 Oct 1997 16:27:04 -0400  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19971016162704.00842100@mail.mich.com>  
Rendered body type: text/plain

Here is a archive of the wavelan mailing list  
if anyone is interested:

<http://www.cs.tamu.edu/people/mmehta/links/wavelan.txt>

Don't have the subscribe instructions handy, but should  
be able to dig it out from the archive.

Regards,

-----  
| Jeff King           Aero Data Systems |  
| jeff@mich.com     P.O. Box 510895   |  
| (810)471-1787     Livonia, MI 48151 |  
| F(810)471-0279    United States     |  
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## 24. Re: [SS:1760] Re: TAPR SS Alpha Boards

From: Jeff King <jeff@mich.com>  
Date: Thu, 16 Oct 1997 16:47:16 -0400  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19971016164716.0083aa40@mail.mich.com>  
Rendered body type: text/plain

At 10:01 PM 10/14/97 -0500, Greg Jones, WD5IVD wrote:

>

> Hi Bob:

< clip to chase>

> I am sure if we could somehow pay people for their work -- thus  
> breaking the volunteer process -- projects could be much more regularly  
> thought up and executed.

Greg, isn't TAPR being paid for the 2nd "NSF" project that you are doing with Pittsburg, Denton and I think Hawaii... the one to implement SS links for the school systems. I know TAPR is listed on the proposal but it wasn't clear to me that this was a TAPR project or just something on the side you Dwayne and Barry are doing. I do know nothing has been published or said about this in a public forum and only minimal information about the "1st" NSF proposal has ever been released.

My point is exactly yours, more could be done with money. I've expressed interest to you in becoming involved with some of these NSF proposals that associated directly with TAPR, or at the very least have a "roadmap" laid out that would allow the membership to:

1. Know ahead of time about these projects.
2. How they could contribute and benefit from these projects.
3. How they can become involved in these projects.

What do you think?

Regards,

```
-----
| Jeff King      Aero Data Systems |
| jeff@mich.com  P.O. Box 510895   |
| (810)471-1787  Livonia, MI 48151 |
| F(810)471-0279 United States     |
-----
```

---

## 25. Re: SS Board.

From: Darryl Smith <vk2tds@ozemail.com.au>  
Date: Thu, 16 Oct 1997 17:29:42 -0400  
To: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Cc: w9ddd@tapr.org, wd0etz@tapr.org, ss@tapr.org  
Message-ID: <34468746.3304874B@ozemail.com.au>  
Rendered body type: text/plain

> If it is okay -- I would like to post this to the SS list, since we had  
> already started this thread on there. If we do this as private e-mail now,  
> the group that believes that the secret cabal is at work will feel left  
> further out of the loop. If you want, just redirect it back to the list.

Done...

>

> > Basically the reason why I did not go to you directly was because I  
> > asked the question on Sunday during the presentation, and it was  
> > suggested that what I was suggesting would not be a good use of  
> > resources.

>

> Well -- I don't think that is necessarily the case...but I do feel that Tom  
> was expressing his thoughts about what he feels the proper use of the  
> 900Mhz FHSS radio design is. I agree with it, but that doesn't mean that  
> we don't consider anything proposed no matter how fast the comment Tom made  
> during the presentation. Do remember that Tom was trying to fit into his  
> time period, so I believe that an unhurried Tom would have given you a  
> little more in depth response to your question and possibly would have been  
> able to take a little more discussion on the issue. As it was, he  
> responded quickly and a little short and kept going. This was my fault,  
> since I allowed the seminar to get a little behind schedule to begin with  
> -- but I felt that Phil needed the additional time to complete his section  
> of the seminar.

>

Sorry if I went a bit overboard. I was coming down with a virus at the time which was a bit of a pain. [and promptly spent about 2 days sick in bed when I was planning to see DC again]

> The quest for the ultimate TNC is a questionable goal these days, don't you  
> think ? Probably not since I read your paper :-) -- at least one that is  
> designed specifically by amateurs. That was one of many reasons the TNC-95  
> project was scrapped. When I was thinking about the TNC-95, four years  
> ago, I should have figured that and I had people tell me -- so I'll admit  
> it was a mistake, but you hopefully learn from them. The controller for  
> the radio is the case of a specific application requiring a fairly  
> integrated designed controller to make it all work together. A general  
> purpose processor -- which we found pretty much like what we have in the  
> design did not meet the necessary requirements for use without a lot of  
> work and cutting.

People still need TNC's. They need them PNP too.

>  
>  
> There are other controllers easily available like the board we have on this  
> unit...we purchased two development boards with the same basic functioning  
> on it for about \$300 a board in single qty that has the same basic chips we  
> have on the TAPR board -- just that it would be a clue (sp) to use it in  
> the final development. If you purchase enough of them, the price drops to  
> like \$150. I didn't get a chance to mention this to you at the conference,  
> but I wanted to get the info from Bill Reed before I dropped you a note  
> about the source.  
>  
> I'll ask Bill Reed on his return and find out where he got those and pass  
> it along.  
>

Great. The reason why I chose the Cirrus chip was the cost of the 360. But for  
\$150 in qty it is cheap. Besides you can always add a cirrus..

> You can get these now without waiting for the team to debug the current  
> integrated design.  
>  
> John Koster and myself had already discussed what you asked, since we have  
> been thinking along the same lines about how to lower cost of the boards in  
> the long run with our production. It is too bad that John was unable to  
> attend the DCC this year, since he would have more time than myself to  
> follow up after the seminar.  
>  
> >All that would be required to the SS board would be a header for the  
> >SYNC and ASYNC ports allowing experimenters to access these pins. The  
> >only cost would be the extra holes.  
>  
> Yes.  
>  
> >OK - What I would like to suggest is a 3 port TNC based on the 68360  
> >with an extra 2 async ports for modems, allowing GPS and modem to be  
> >plugged in. Ideally level converters are required, but they could be on  
> >a cheap single sided daughter board.  
>  
> That board already exists as I described above. I'll get you that info  
> when I get it. Also, PacComm has a design...not sure Gwyn ever made it  
> available, but Graclis ported their code over to the 68360 for the design.  
> That would be a great solution since it would have a really excellent  
> software package on it already.

The software is also propriety. I really want something I can program, and other  
hams can program. Personally, I will probably never use this sort of TNC, but  
many of my friends would. I get most from the hobby from hacking. Others get the  
fun from using.

>  
>  
> >Also the BDM should be connected allowing the FLASH RAM to be programmed  
> >through a serial port without loader software.  
>  
> We are using the BDM in the current radio design. I think Tom mentioned this.  
>  
> >I am not talking about putting full nos on the board at this stage, but  
> >something that will encapsulate AX25 frames in Ethernet frames for a NOS  
> >station..  
>  
> Why not. There is plenty of room to put NOS on the thing.

Nos adds complexity. Firstly do the simple things, and get them out, then add the  
harder things.

```

>
>
> The real issue is not the controller in my thought -- but the radio. Like
> the PRUG 768Kbps system. Did anyone notice that there was no picture of a
> 1.2 G radio ? They don't have any RF yet for the modem you saw at the
> banquet. So, without a radio (in our case a FHSS that sits on the
> controller) a highspeed switch with a 68360 doesn't gain you much. Much
> like the PacketTen as Barry pointed out to me Saturday night.

In Australia our local radio BBS was with something like 5 or 6 radio ports. It
was a huge problem to set it up. There is no problem having 1200 links up 24 hours
a day. I know of people who have sent DOOM about sydney on the 1200 frequencies
with 5 links. It took a while but worked. Basically the reason why I feel that
TNC's are still needed is that the radios are not there yet!. And the radios will
not get there without a cheap controller.

Provided the DCC is close to an airport with free transfers...

> Cheers -- Greg
>
> -----
> Greg Jones, WD5IVD
> Austin, Texas
> wd5ivd@tapr.org
> http://www.tapr.org/~wd5ivd

```

---

## 26. Re: [SS:1765] Re: TAPR SS Alpha Boards

```

From: Kent Farnsworth <akent@bga.com>
Date: Thu, 16 Oct 1997 17:50:10 -0500
To: ss@tapr.org
Message-ID: <199710162250.RAA01599@zoom.bga.com>
Rendered body type: text/plain

```

Hello:

I have been involved in commercial RF digital communications design for a while now on my own, and have a fairly complete RF laboratory. I wonder about the same things as Jeff. He has valid concerns.

I am a TAPR member. I have never seen a 'request for participation'. All you would need to do is maybe ask for credentials, available time, along with the requirement of work. You might or might not offer to pay for anything, depending on the situation. Some of us have time for project participation!

And TAPR, some of us have wonderful ideas that you should perhaps listen to. Not only are the rest of us interested, we would love a chance to be a part of the next generation of your products.

I also wonder why some of the details and code (hardware and software) are not public domain for the previous projects that you now sell. Hummm?!?!

Kent Farnsworth - KC5WPW

```

<major snip>
>My point is exactly yours, more could be done with money. I've expressed
>interest to you in becoming involved with some of these NSF proposals that
>associated directly with TAPR, or at the very least have a "roadmap" laid
>out that would allow the membership to:
>
>1. Know ahead of time about these projects.
>2. How they could contribute and benefit from these projects.
>3. How they can become involved in these projects.
>
>What do you think?
>
>
>Regards,
>
>-----
>| Jeff King      Aero Data Systems |
>| jeff@mich.com  P.O. Box 510895   |
>| (810)471-1787  Livonia, MI 48151 |
>| F(810)471-0279 United States     |
>-----
>
>
>
--- Kent Farnsworth (akent@bga.com)

```

## 27. Re: [SS:1765] Re: TAPR SS Alpha Boards

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Thu, 16 Oct 1997 20:06:43 -0500  
To: ss@tapr.org  
Message-ID: <v03110705b06c67c4e7e3@[206.133.11.141]>  
Rendered body type: text/plain

>At 10:01 PM 10/14/97 -0500, Greg Jones, WD5IVD wrote:

>>

>> Hi Bob:

>

>< clip to chase>

>

>> I am sure if we could somehow pay people for their work -- thus  
>>breaking the volunteer process -- projects could be much more regularly  
>>thought up and executed.

>

>Greg, isn't TAPR being paid for the 2nd "NSF" project that you are doing  
>with Pittsburgh, Denton and I think Hawaii... the one to implement SS links  
>for the school systems. I know TAPR is listed on the proposal but it wasn't  
>clear to me that this was a TAPR project or just something on the side you  
>Dewayne and Barry are doing. I do know nothing has been published or said  
>about this in a public forum and only minimal information about the  
>"1st" NSF proposal has ever been released.

That grant was not funded from what I heard from the writers. Anyway -- I  
was only in the proposal as a consultant and they listed my title as Pres  
of TAPR I guess to help the weight of the proposal. I maybe spent a few  
hours helping write one section of the grant. If it had been funded, I  
would have gotten about 5 hours of consultant time and TAPR would have  
gotten some good press for being involved.

To date, none of our proposals have been funded. We only have one in the  
pipe which we will not know about for sometime and are thinking about  
writing another one.

>My point is exactly yours, more could be done with money. I've expressed  
>interest to you in becoming involved with some of these NSF proposals that  
>associated directly with TAPR, or at the very least have a "roadmap" laid  
>out that would allow the membership to:

>

- >1. Know ahead of time about these projects.
- >2. How they could contribute and benefit from these projects.
- >3. How they can become involved in these projects.

The problem is that this stuff is very fluid. We (Dewayne and myself) map  
strategy on a month or even weekly basis. If I had written something for  
the next PSR that detailed what we thought would be happening when it went  
to print, it would have already been out dated with our meetings last week.  
Thus - it makes me and the organization look bad when we try to say what is  
happening, only to have to write that it was all wrong and here is the new  
slant and do that each quarter. Been there done that. Not a good thing to  
be doing.

So -- you just have to trust we are working in the best interest of the  
organization and when people can get involved, we will make the  
announcement and offer positions of support.

What you can be doing is coming up with things that we can try to go out  
and find money to do. Without projects to show developmetn for fudning,  
then we can't expect to find anything. We have to have things like the  
900Mhz radio project and more like it to really get the well primed in  
order to track down those big grants that might eventually be able to get  
things designed and done for 219-220 and othere we would like to have  
things working.

Bringing up 219-220. How about someone figure out how to do a DSS system  
on 219-220 that we can implement to allow folks to operate with the AMTS  
people. We really have to do something to show activity on that band -- or  
all that money that ARS spent to get it back will have been for not.

Good news tonight. We have a led on WaveLan stuff and will be sniffing  
that down in the coming weeks. If we can work a deal, we might have  
something interesting to offer. If we do it -- sure going to need a lot of  
help putting a package of information together to go with it.

Cheers - Greg

-----



Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>

---

## 28. Re: [SS:1767] Re: TAPR SS Alpha Boards

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Thu, 16 Oct 1997 21:06:41 -0500  
To: ss@tapr.org  
Message-ID: <v03110707b06c6bacd2bf@[206.133.11.141]>  
Rendered body type: text/plain

>Hello:

>

>I have been involved in commercial RF digital communications design for a  
>while now on my own, and have a fairly complete RF laboratory. I wonder  
>about the same things as Jeff. He has valid concerns.

>

>I am a TAPR member. I have never seen a 'request for participation'. All you  
>would need to do is maybe ask for credentials, available time, along with  
>the requirement of work. You might or might not offer to pay for anything,  
>depending on the situation. Some of us have time for project participation!

Well -- participation in what ?

As stated in the first posting -- we really look for people to come to us  
with project concepts. When we have a project in beta we do ask for  
participants. Just read back in previous PSRs and in various SIG emails.  
The MIC-E, DSP-93, AN-93, TUC-52, have all had calls for people to  
participate in form or another. We asked for beta testers in the Freewave  
fiasco and got a number involved. There have been lots of calls over the  
last three years. You just have to read to see them.

The 900Mhz radio isn't in a position to accept any help at this time. When  
additional testers beyond the design group are needed we will probably  
start to ask. I know that the first group of beta testers -- as I already  
outlined in an earlier message -- will have to have special equipment,  
time, and ability. After that, it opens up a little more as we get into  
field testing-- which will probably be done based on affiliated groups with  
TAPR.

>And TAPR, some of us have wonderful ideas that you should perhaps listen to.  
>Not only are the rest of us interested, we would love a chance to be a part  
>of the next generation of your products.

The issue becomes, what do you want to do ? Are you prepared to invest the  
personal time to make it happen as a TAPR project ? Is so -- let's get  
going ;-) There are plenty of projects I could list. We need a biliterate  
amp for 900MHz and 2.4MHz that we can build instead of purchase for several  
hundred dollars each. We need RF to make the Japan 768Kbps modem work on  
1.2G. We need something on 219-220 for a potential DSS system to be  
designed with and lots more. Someone could even follow up on the Robert's  
proposal which no one did last fall, on his design. I think I posted at  
least twice asking if anyone was going to do anything with the message that  
was posted. No one ever did.

>I also wonder why some of the details and code (hardware and software) are  
>not public domain for the previous projects that you now sell. Hummm?!?!

Which ones ? The TNC-2 ? Just for the record -- we never owned the TNC-2  
source code. That is owned by someone else -- Infomotion. All other  
projects have the code available, except the DSP-93 monitor which is about  
to become available. The reason for that was to maintain compatibility in  
all production units until the project/kit was completed -- which it is  
about to be. The PALS are available for the 9600baud modem and you can even  
get the source for the Devmeter if you want to use it.

So, what project(s) are you referring to ?

I am glad to see that we have RF folks on the list. What can you and TAPR  
do together Ken to help others ?

Cheers - Greg

-----

Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org

## 29. Re: [SS:1761] Re: WaveLAN specs

From: bm@lynx.ve3jf.ampr.org  
Date: Fri, 17 Oct 1997 02:31:58 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <199710170231.CAA19711@lynx.ve3jf.ampr.org>  
Rendered body type: text/plain

Bernie Doehner <bad@uhf.wireless.net> wrote:

> > Sigh... attendees of my DCC paper on propagation know that it's 24 dBm,  
> > not 26. :-). Actually, I just took a peek at the web site, and they say 23 dBm.  
> > The nominal bandwidth of WaveLAN is 11 MHz, centered at 915 MHz. The 2.4 GHz  
> > product has lower power output (15 dBm), and several choices of center  
> > frequency (up to 8, depending on version). The biggest problem with WaveLAN  
> > (and other similar products) is the relative deafness of the receiver, which  
> > seems to suffer from both poor noise figure and hefty modem implementation  
> > loss - it needs an SNR of around 35 dB to deliver a low BER.  
> >  
> > Barry  
>  
> Barry:  
>  
> Have you ever figured out a correspondence between signal  
> level/noise/quality and REAL SNR? I tried, and found the variance between  
> adjacent measurements to be too large to make any sense. Maybe I have to  
> average over longer periods of time (I am working with the FreeBSD Wavelan  
> driver, which includes a signal strength cache).

No - I've looked at it briefly, but didn't establish any correspondence.  
One of these days I want to take a close look at WaveLAN (and others) under  
lab conditions, where I can look at receiver sensitivity, effects of in-band  
and out-of-band interference, multipath immunity, etc. That would be a good  
chance to also try and calibrate the params that the cards provide.

Barry

--

|                           |              |  |                                                                      |
|---------------------------|--------------|--|----------------------------------------------------------------------|
| Barry McLarnon            | VE3JF/VA3TCP |  | Internet: bm@hydra.carleton.ca                                       |
| Ottawa Amateur Radio Club |              |  | AMPRnet: bm@lynx.ve3jf.ampr.org                                      |
| Packet Working Group      |              |  | Web: <a href="http://hydra.carleton.ca">http://hydra.carleton.ca</a> |

## 30. Re: [SS:1763] Re: WaveLAN specs

From: Fred Treasure <fred@astro.wnmu.edu>  
Date: Thu, 16 Oct 1997 15:48:21 -0600 (MDT)  
To: ss@tapr.org  
Message-ID: <199710162148.PAA02348@astro.wnmu.edu>  
Rendered body type: text/plain

Hi Robert,

One interesting feature (problem?) of the 900 MHz WaveLAN cards is that  
they all run on the same frequency and same coding sequence. The network  
identifier does not cause the card to change anything about the transmission  
characteristics, hence every WaveLAN card hears every other card within  
range. In the amateur radio context this can be a problem because there is  
nothing to separate the the various Novell LANs (which are quite "chatty"  
with SAP packets, etc.) from our TCP/IP LANs. In the network that I have  
running I relocated the antennas, and used more directional antennas to  
solve this problem but I can see that in a bigger town (Silver City, NM is  
just 10,000 folks) it might be a challenge to find a clear path.

Hope that this bit of information that you can't get from the spec. sheets  
is useful...

73, Fred ke5ci  
fred@astro.wnmu.edu

## 31. Re: [SS:1768] Re: TAPR SS Alpha Boards

From: "Gerald J. Creager N5JXS" <n5jxs@tamu.edu>  
Date: Fri, 17 Oct 1997 09:43:44 -0500  
To: ss@tapr.org  
Message-ID: <344779A0.5490@tamu.edu>  
Rendered body type: text/plain

Greg Jones, WD5IVD wrote:

> ...  
>  
> What you can be doing is coming up with things that we can try to go out

> and find money to do. Without projects to show developmetn for fudning,  
> then we can't expect to find anything. We have to have things like the  
> 900Mhz radio project and more like it to really get the well primed in  
> order to track down those big grants that might eventually be able to get  
> things designed and done for 219-220 and otherwe we would like to have  
> things working.  
>  
> Bringing up 219-220. How about someone figure out how to do a DSS system  
> on 219-220 that we can implement to allow folks to operate with the AMTS  
> people. We really have to do something to show activity on that band -- or  
> all that money that ARS spent to get it back will have been for not.

I like this thought, Greg. Let me get past finals in Dec., and see what we can do. I can also see if I can lay hands on some SS decks Trimble Nav. has been using in the 900 MHz range where they CLAIM the RF is "straightforward and adaptable to other bands." They're phasing that line out from what I last heard... may be something there.

> Good news tonight. We have a led on WaveLan stuff and will be sniffing  
> that down in the coming weeks. If we can work a deal, we might have  
> something interesting to offer. If we do it -- sure going to need a lot of  
> help putting a package of information together to go with it.

I'll be following this with interest, too. My new workshop and RF lab should be built in about 2 months here at home. I hope to have more home time after Dec., plus or minus the newest family addition.

73, gerry

---

### 32. Re: TAPR SS Alpha Boards

From: dzn1@juno.com (Howard D Rubin)  
Date: Fri, 17 Oct 1997 23:30:24 -0400  
To: ss@tapr.org  
Cc: ss@tapr.org  
Message-ID: <19971017.233031.6598.0.dzn1@juno.com>  
Rendered body type: text/plain

Regarding that RF lab at home, I wonder if you intend to populate it with professional equipment and surface mount assembly gear. Do you have a wish list of hardware? Maybe you could suggest a lab environment for other TAPR members to build over a period of time. Building a lab out of fleamarket equipment to do something useful in the 2.4 G band would be real fun.

Regards, Howard Rubin, N3FEL

---

### 33. Re: [SS:1773] Re: TAPR SS Alpha Boards

From: "Gerald J. Creager N5JXS" <n5jxs@tamu.edu>  
Date: Sat, 18 Oct 1997 09:12:02 -0500  
To: ss@tapr.org  
Message-ID: <3448C3B2.53A6@tamu.edu>  
Rendered body type: text/plain

SMT assembly gear is not in the cards: I don't have a sufficient space to properly do the convection heating or wave soldering. As for SMT rework, I've got some thoughts and plan to be in that realm in a year or 2. For now I have access on a limited basis to a rework lab here at TAMU.

As for the RF test gear, it's old but professional.

---

### 34. Re: [SS:1774] Re: TAPR SS Alpha Boards

From: Lyle Johnson <lylej@azstarnet.com>  
Date: Sat, 18 Oct 1997 09:58:55 -0700  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19971018095855.00772420@pop.azstarnet.com>  
Rendered body type: text/plain

At 09:18 AM 10/18/97 -0500, you wrote:

>SMT assembly gear is not in the cards: I don't have a sufficient space  
>to properly do the convection heating or wave soldering.

For building modules for P3D using extensive surface mount, we use:

1) temp conrolled soldering iron with fine tip. Sometimes we use two simulataneously to melt the solder at both ends of a passive part.

2) flux.

3) microscope to inspect the work for flight, but usually a simple magnifying glass (or a near-sighted person without glasses) is more than adequate.

4) care.

5) practice.

We can solder fine-pitch ICs with hundreds of leads.

With a little practice, SMT hand-assembly is EASIER than through hole.

Note that using these techniques some of our work has been inspected to ESA flight standards by ESA certified perosnnel with no problems.

>As for SMT

>rework, I've got some thoughts and plan to be in that realm in a year or

>2. For now I have access on a limited basis to a rework lab here at

>TAMU.

Same equipment as above plus a GOOD heat gun with some shileds to keep the heat out of the wrong places. Usually you sacrifice the part you are removing.

Bottom line: SMT is not hard, does not require extensive equipment. SMT is an ENABLING technology for experimentation...

(And no I don't have a video on how to do it :-)

73,

Lyle

---

### 35. Re: Q: PCMCIA DSP's for SW development, etc.

From: Brian Carlson <bcarlson@cyberramp.net>

Date: Sat, 18 Oct 1997 17:50:33 -0500

To: Henry Baker <hbaker@netcom.com>

Message-ID: <34493D39.785D@cyberramp.net>

Rendered body type: text/plain

Hello Henry,

You can get a TI 'C32-based PCMCIA cards from CAC. The basic version is \$895 and provides a stereo codec, 1MB SRAM and 512kB of Flash. You can get more memory including up to 4MB of DRAM also. A really nice board in a Type II or III slot.

It comes with support software. You can also get real-time block diagram support from Hyperception that allows you to build applications for it quickly and even program the Flash memory directly from it. It can auto-boot from Flash, so you can save an application and have it always boot up at power-up. I took advantage of this by making a standalone box with a PCMCIA connector in it only providing power to the card. The serial port and audio interfaces were also accessible. This box became a nice programmable product that could be programmed using standard TI tools or automatically from with visual design with Hypersignal RIDE. Its also a nice way to provide a portable DSP platform using a standard notebook computer.

Here is a web page for you that provides further details:

<http://www.cacdsp.com/products/bulletedsp.html>

Regards,  
Brian

-----  
Henry Baker wrote:

>

> On TI's (excellent!) web site, I read about a DSP chip with memory that  
> resided on a PCMCIA card that could be used as a co-processor for a laptop  
> to do compute-intensive operations as well as software development.

>

> Is this card for sale anywhere? Does it come with software?

>

> Are there any equivalent cards around -- i.e., programmable DSP's with  
> software that run on a variety of machines ??

>  
> I know that the AV Macs had some sort of Moto DSP, but I don't think they  
> made it particularly easy to do custom software on it.  
>  
> Do soundblaster's have a programmable DSP?  
>  
> I'm hoping for a card + development software (C, assembler, etc.) that  
> would be < \$500.  
>  
> Thanks in advance.

---

### 36. Propagation Article on the Net...

From: bm@lynx.ve3jf.ampr.org  
Date: Mon, 27 Oct 1997 04:28:58 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <199710270428.EAA00005@lynx.ve3jf.ampr.org>  
Rendered body type: text/plain

Things have gone quiet on the ole SS list again...

I did a tutorial piece on VHF to Microwave radio propagation for the ARRL/TAPR Digital Communications Conference that was held in Baltimore a few weeks back, and there is now a HTML'ized version at

<http://hydra.carleton.ca/articles/ve3jf-dcc97.html>

There have been a few minor revisions and additions since the version published in the DCC proceedings, and I hope to add some more material as time permits.

I thought maybe it would fuel some discussion here, so have a look and tell me what you think...

Barry

--

|                             |                                                                      |
|-----------------------------|----------------------------------------------------------------------|
| Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca                                       |
| Ottawa Amateur Radio Club   | AMPRnet: bm@lynx.ve3jf.ampr.org                                      |
| Packet Working Group        | Web: <a href="http://hydra.carleton.ca">http://hydra.carleton.ca</a> |

---

### 37. WARNING: message delayed at "bnr.ca"

From: nortel.postmaster@nortel.ca  
Date: Mon, 27 Oct 1997 08:38:10 -0500  
To: ss@tapr.org  
Message-ID: <199710271354.HAA12068@tapr.org>  
Rendered body type: text/plain

\*\*\*\*\*  
\*\* NORTEL E-Mail Gateway Warning Message \*\*  
\*\*\*\*\*

Delivery of your e-mail message to michael.gallen.2879930@bnr.ca has been delayed at a NORTEL E-Mail Gateway.

If it is not delivered within 28 hour(s), a failed delivery report will be returned to you.

---

### 38. Re: [SS:1777] SS digest 418

From: Glenn Elmore <ge@hpsadr2.sr.hp.com>  
Date: Mon, 27 Oct 1997 09:28:33 -0800 (PST)  
To: ss@tapr.org (ge)  
Message-ID: <199710271728.AA166723313@hpsadr2.sr.hp.com>  
Rendered body type: text/plain

Barry writes:

> Things have gone quiet on the ole SS list again...  
>  
> I did a tutorial piece on VHF to Microwave radio propagation for the ARRL/TAPR  
> Digital Communications Conference that was held in Baltimore a few weeks back,  
> and there is now a HTML'ized version at  
>  
> <http://hydra.carleton.ca/articles/ve3jf-dcc97.html>  
>

Barry,

Thanks for the work and for putting it up. It's a very helpful work and I intend to link to it from my pages.

I think this is an excellent subject for this list and is at the core of the problem of AR networking and wide application of SS.

My only fear is that the consequences of this theory will be glossed over or ignored by those who see it. Other than by building a 'library' of practical sites and paths (with pictures) and the associated path losses measured, I can't think how to bring this to an even more practical and user oriented level.

I don't know if I can count the number of times hams have told me "my path is LOS" only to discover later that it really wasn't and that losses were 20-60 dB greater than they expected, generally making it unusable for their application(s).

As much as those of us on this list might desire it, SS is no substitute for a quality site and path between ends of a link.

Glenn Elmore n6gn

amateur IP: glenn@SantaRosa.ampr.org  
Internet: ge@sr.hp.com  
n6gn@sonic.net

```
|----- N6GN's Higher Speed Packet WWW Page -----|
|
|      http://www.tapr.org/~n6gn/index.html
|      http://www.sonic.net/~n6gn
|
|-----|
```

---

### 39. Re: [SS:1777] Propagation Article on the Net...

From: Brian Bartholomew <bb@wv.com>  
Date: Mon, 27 Oct 1997 12:54:39 -0500  
To: ss@tapr.org  
Message-ID: <199710271754.MAA05316@battleship>  
Rendered body type: text/plain

> One problem is that most of the people attracted to using digital  
> wireless techniques have little or no background in RF.

Yes, exactly. I'm a Unix sysadmin/developer/electronics tech who would dearly love to be playing with 100 Mbit links on GHz carriers. Unfortunately I can't find a radio person to partner with.

> Example 1. Suppose you have a pair of 915 MHz WaveLAN cards, and  
> want to use them on a 10 km link on which you believe free space  
> path loss conditions will apply.

Yes, exactly. Or a 100 Mbit full-duplex ethernet card feeding a transceiver of unspecified design. Is there anybody on this list who wants to trade computer networking expertise for high-frequency data radio expertise?

Another member of the League for Programming Freedom (LPF) [www.lpf.org](http://www.lpf.org)

-----  
Brian Bartholomew - [bb@wv.com](mailto:bb@wv.com) - [www.wv.com](http://www.wv.com) - Working Version, Cambridge, MA

---

### 40. Re: Propagation Article on the Net...

From: Don Lemke <wb9mjn@wb9mjn.ampr.org>  
Date: Mon, 27 Oct 1997 15:40:39 -0600  
To: ss@tapr.org  
Cc: ve3jff@tapr.org  
Message-ID: <34550A57.7719@wb9mjn.ampr.org>  
Rendered body type: text/plain

Hi Barry,

Very Well Done! Your dcc-97 article web page is clear and straight forward.

I noticed from it, that I have been unclear in the past with regards to Knife Edge/Flat Earth diffraction. No wonder I was confusing.

I did not see any conflicts with what I've tried to say on the news group here, versus what ur article says.

These things happen. Especially, when one learns something 10 years ago, and then try to relate it to people, today, hi.

The reality of the Radio Environment is the true driving force behind what we can do next. Which is why I think we need access techniques that integrate antenna directivity into radio networking, in a dynamic fashion.

--

73, Don.

AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]  
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu  
Website: <http://www.qth.com/antpanel>

---

#### 41. Re: [SS:1777] Propagation Article on the Net...

From: Lawrence Stoskopf <stoskopf@tri.net>  
Date: Mon, 27 Oct 1997 15:48:25 -0600  
To: ss@tapr.org  
Message-ID: <34550C29.418EF495@tri.net>  
Rendered body type: text/plain

>  
>  
> I did a tutorial piece on VHF to Microwave radio propagation for the  
> ARRL/TAPR  
> Digital Communications Conference that was held in Baltimore a few  
> weeks back, and  
> there is now a HTML'ized version at  
>  
>  
> I thought maybe it would fuel some discussion here, so have a look and  
> tell me  
> what you think...  
>  
>

Nice article, especially as I am setting up a remote HF site at about 12 LOS and was wondering about design parameters.

Thanks

N0UU

---

#### 42. IR-Laser Interface

From: Mike Cheponis <mac@wireless.com>  
Date: Tue, 28 Oct 1997 13:55:35 -0800 (PST)  
To: ss@tapr.org  
Message-ID: <Pine.BSD/.3.91.971028135440.19679G-100000@ns1.culver.net>  
Rendered body type: text/plain

Although this is not strictly SS, perhaps some on this list can help these school folks?

very best -Mike k3mc

----- Forwarded message -----  
Date: Tue, 28 Oct 1997 08:54:57 +0100  
From: Roel Verbroekken <r.verbroekken@wxs.nl>  
To: mail@wireless.com  
Subject: IR-Laser Interface

Dear Sir.

We need to build a Full-Duplex IR Stereo-Audio/Data wireless Communication system( not audio and data at the same time) ,distance about 50m,150FT and speed about 5Mbps for a school-project . To accomplish this we are planning to use the following method:

We use an ADC to convert a stereo-Audio-signal to an 16-bit, digital signal which is then send by the same transmitter that we use for data transmission.  
On the receiving end we use an DAC to convert the digital data back to an audio-signal.  
We do it this way because we now can use the same components for sending

audio and digital data.

To allow two computers to communicate we use a multiplexer to convert the parallel-port data to an serial-signal which can be transmitted using the laser, on the receiving end we use a de-multiplexer to convert the data back.

We need to send the Clock for synchronisation of the two Multiplexers and the decoders.

We use an IC to code the Clock-pulse into the data by using the manchester or any other method. We then use an laser to send the combined signal to the receiver which decodes the signal and output's the clock and data signals.

To accomplish the full-duplex connection we plan on using two of these systems in conjunction.

The problem is we can't find an IC to use for coding and decoding using the manchester (or any other) method.

We were hoping you could help us in selecting the right IC's and laserdiode's for this project.

Thanx in advance  
Kai-Arne Reiter & Roel Verbroekken  
Gilde College Noord Limburg

Kai-Arne Reiter  
De Bisweide 32  
5971 AZ, Grubbenvorst  
The Netherlands  
Tel: +31 (0)77 3270035  
Fax: +31 (0)77 3662292  
E-mail: [mrspock@worldaccess.nl](mailto:mrspock@worldaccess.nl)  
Website: <http://mirrorspock.mypage.org>

Roel Verbroekken  
Overambt 25  
5821 CC, Vierlingsbeek  
The Netherlands  
Tel: +31 (0)478 631891  
E-mail: [r.verbroekken@wxs.nl](mailto:r.verbroekken@wxs.nl)

---

## 43. Re: [SS:1783] IR-Laser Interface

From: Trevor Barron <[tbarron@newlink.net](mailto:tbarron@newlink.net)>  
Date: Wed, 29 Oct 1997 09:09:53 -0500  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <3.0.3.32.19971029090953.0069ad4c@newlink2000.com>  
Rendered body type: text/plain

Don't overlook the fact that when sending the 16b digitized audio, you will need to obtain not only bit sync but word sync as well.

The manchester encoding will help you with bit sync, but you need to send some framing data for word sync as well so you can grab the proper 16bits that make up your digitized music data word.

You have the option of doing your encoding/decoding for both bit and word sync in either hardware or software. If you have a computer in your project already, and want to minimize external components, then I'd recommend the software approach.

I'll dig into some previous projects and see what I come up with for hardware solutions.

Regards,

Trevor Barron KA1TW  
NEWLINK Global Engineering

At 03:45 PM 10/28/97 -0600, you wrote:

>Although this is not strictly SS, perhaps some on this list can help these  
>school folks?

>

>very best -Mike k3mc

>

>

>----- Forwarded message -----

>Date: Tue, 28 Oct 1997 08:54:57 +0100

>From: Roel Verbroekken <[r.verbroekken@wxs.nl](mailto:r.verbroekken@wxs.nl)>

>To: [mail@wireless.com](mailto:mail@wireless.com)

>Subject: IR-Laser Interface





interpret this to mean that the League will not accept the Part 15 "safe Harbor" provision in the R&O. It is unclear what the League will do if the FCC will not issue the Declaratory Ruling.

-- Dewayne

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

In the Matter of )  
 )  
Amendment of Part 90 of the ) PR Docket No. 93-61  
Commission's Rules to Adopt )  
Regulations for Automatic Vehicle )  
Monitoring Systems )

MEMORANDUM OPINION AND ORDER  
AND FURTHER NOTICE OF PROPOSED RULE MAKING

Adopted: August 28, 1997 Released: September 16, 1997

Comments Due: November 5, 1997

Reply Comments Due: November 20, 1997

By the Commission:

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Appendix A -- Pleadings

Appendix B -- Initial Regulatory Flexibility Analysis (Further Notice of Proposed Rule Making)

Appendix C -- Final Regulatory Flexibility Analysis (Report and Order)

Appendix D -- Rule Changes

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4. LMS operates in the 902-928 MHz frequency band. The band is allocated for primary use by Federal Government radiolocation systems. Next in order of priority are Industrial, Scientific and Medical (ISM) devices. Federal Government fixed and mobile and LMS systems are secondary to both of these

uses. The remaining uses of the 902-928 MHz band include licensed amateur radio operations and unlicensed Part 15 equipment, both of which are secondary to all other uses of the band. Part 15 low power devices include, but are not limited to, those used for automatic meter reading, inventory control, package tracking and shipping control, alarm services, local area networks, internet access and cordless telephones. The amateur radio service is used by technically inclined private citizens to engage in self-training, information exchange and radio experimentation. In the LMS Report and Order, the Commission recognized the important contribution to the public provided by Part 15 technologies and amateur radio operators and sought to develop a band plan that would maximize the ability of these services to coexist with LMS systems.

5. The Commission adopted the LMS Report and Order with an eye toward minimizing potential interference within and among the various users of the 902-928 MHz band. The Commission's band plan accordingly permits secondary operations across the entire band by users of unlicensed Part 15 devices and amateur licensees. At the same time, the band plan separates non-multilateration from multilateration LMS systems in all but one subband so as to avert interference. The LMS Report and Order also established limitations on LMS systems' interconnection with the public switched network and set forth a number of technical requirements intended to ensure successful coexistence of all the services authorized to operate in the band.

6. This Memorandum Opinion and Order for the most part affirms decisions made by the Commission in the LMS Report and Order as an appropriate balancing of the interests of the different uses authorized in the band. Where appropriate, we clarify particular aspects of those decisions. First, we review petitioners' objections to our interconnection restrictions and clarify that the regulatory classification of LMS operators will be determined on a case-by-case basis. Next, we address petitioners' concerns regarding the definition and scope of the non-multilateration LMS service. We then discuss issues raised by petitioners regarding the "safe harbor" within which Part 15 devices and amateur operators will be deemed not to cause interference to multilateration LMS providers. We next address petitioners' suggested changes to the band plan adopted in the LMS Report and Order, as well as our decision to license multilateration LMS systems on a major trading area (MTA) basis. We further consider the propriety of allowing multilateration wideband forward links to operate in the 902-928 MHz band. Finally, in a Further Notice of Proposed Rule Making included as part of this item, we propose rules and procedures governing competitive bidding for multilateration LMS frequencies.

#### B. Accommodation of Secondary Users in the 902-928 MHz Band

28. Background. To accommodate the concerns of Part 15 interests regarding their secondary status vis-a-vis LMS, the LMS Report and Order adopted a "safe harbor" within which Part 15 devices may operate without fear of being deemed to cause interference to LMS operators. Specifically, a Part 15 device will, by definition, not be considered to be causing interference to a multilateration LMS system if it is otherwise operating in accordance with the provisions of Part 15 and meets at least one of the following conditions:

(a) it is a Part 15 field disturbance sensor operating in compliance with Section 15.245 of the rules and it is not operating in the 904-909.750 or 919.750-928.000 MHz sub-bands; or

(b) it does not employ an outdoor antenna; or,

(c) if it does employ an outdoor antenna, then if

(1) the directional gain of the antenna does not exceed 6 dBi, or if the directional gain of the antenna exceeds 6 dBi, it reduces its transmitter output power below 1 watt by the proportional amount that the directional gain of the antenna exceeds 6 dBi; and,

(2) either

(A) the antenna is 5 meters or less in height above ground; or,

(B) the antenna is more than 5 meters in height above ground but less than or equal to 15 meters in height above ground and either:

(i) adjusts its transmitter output power below 1 watt by  $20 \log(h/5)$  dB, where  $h$  is the height above ground of the antenna in meters; or,

(ii) is providing the final link for communications of entities eligible under Subparts B or C of Part 90 of the rules.

29. In its Order on Reconsideration in this proceeding, the Commission denied requests by petitioners that the Part 15 safe harbor instead be treated as a rebuttable presumption, i.e., that LMS licensees be permitted to file complaints of interference regarding Part 15 devices operating within the safe harbor if the LMS licensees believe those Part 15 devices are causing harmful interference. The Commission concluded that the safe harbor approach represented an appropriate balancing of the interests of the various parties sharing the 902-928 MHz band. In this Memorandum Opinion and Order, we address petitioners' other contentions regarding the safe harbor. Specifically, petitioners also challenged the technical parameters of the safe harbor and argued that the Commission acted in violation of the Administrative Procedure Act (APA), 5 U.S.C. 551, et seq. In addition, some petitioners ask that the safe harbor apply to non-multilateration LMS operators as well as multilateration operators.

#### 1. Parameters of Safe Harbor

30. Pleadings. A number of parties who support the concept of a safe harbor oppose the height and power restrictions adopted by the Commission. Some of them contend that the height limit should be eliminated, or at least raised to accommodate schools, libraries and other users that might locate their antennas on top of buildings or street light poles. If the Commission does not eliminate or relax the height/power requirements, some parties suggest that it add educational users to the exemption of Section 90.361(c)(2)(ii)(B), which now permits public safety and special emergency users to employ full power with antennas up to 15 meters. Similarly, UTC suggests revising the rule so that entities listed in Section 90.63 of the Commission's Rules (i.e., Power Radio Service entities such as utilities) will not be subject to the height/power restriction. Metricom submits that the safe harbor limits should not apply to mobile and portable Part 15 devices. It posits that a cordless phone being operated off a 50th floor balcony as part of a wireless network should not be subject to complaints of interference from LMS providers. In addition, some parties contend that the height and power restrictions are arbitrary in that they would not necessarily achieve their intended purpose of minimizing interference to LMS operators. For example, the Part 15 Coalition argues that an antenna operation five meters above ground on a mountaintop could cause more interference than an antenna 50 feet above ground located on average terrain.

31. Other parties, most of whom oppose the idea of a Part 15 safe harbor, urge the Commission not to relax the height and power restrictions. Indeed, some of these parties would tighten the parameters of the safe harbor. For example, Uniplex believes that the safe harbor should not include Part 15 devices that are within a given distance of LMS operations, and would apply that distance variable to indoor antennas. Pinpoint would limit the application of the safe harbor to Part 15 operations with antenna heights of five meters or less. Pinpoint contends that the height/power attenuation rule has the undesirable effect of allowing more powerful systems at 15 meters antenna height than at 5 meters to be insulated from interference complaints. Further, Pinpoint argues that any interference tolerance standard should be measured at the base station site (i.e., the receiver of interference) and not based on height and power of Part 15 devices. The American Radio Relay League contends that the safe harbor effectively places a power limit on amateur operators that does not exist in other bands and that the power limit is so severe that it precludes amateur operation in any segment of the 902-928 MHz band used for multilateration LMS. It further contends that the safe harbor was designed with Part 15 devices in mind rather than amateur radio operators.

32. Discussion. We believe that the safe harbor rule, which was adopted after careful study of the extensive record in this proceeding, appropriately balances the interests of the various parties operating in the 902-928 MHz band so as to limit the potential for harmful interference. In the LMS Report and Order, the Commission affirmed that unlicensed Part 15 devices in the band, as in any other band, may not cause harmful interference to and must accept interference from all other operations in the band. It also reiterated that unlicensed Part 15 operations have no vested or recognizable right to continued use of any given frequency. Nonetheless, the Commission recognized the concerns of Part 15 and amateur interests with respect to their secondary status. Accordingly, in order to alleviate such concerns and to provide all operators in the band with a greater degree of certainty in configuring their systems, thereby promoting competitive use of the band, the Commission adopted the safe harbor definition of non-interference.

33. The safe harbor rule is intended to identify Part 15 and amateur operations that will, in all cases, be deemed not to cause harmful interference to LMS operators. The Commission emphasized in the LMS Report and Order that Part 15 and amateur operations are not restricted from operating beyond the parameters of the safe harbor. Rather, the safe harbor specifications provide a threshold beyond which Part 15 and amateur operators will not be insulated from LMS operators' claims of harmful interference. We therefore do not believe it necessary to add exemptions to the safe harbor as urged by some petitioners.

34. Moreover, the technical specifications of the rule were clearly explained in the LMS Report and Order. In general, amateur operators or Part 15 devices using outdoor antennas that are between five and 15 meters above the ground must reduce their output power concomitant with the height of their antennas in order to fit within the safe harbor. The Commission observed that an antenna less than five meters in height driven by a transmitter with one watt or less of output power (the general power limitation for Part 15 devices) will only affect LMS operations that are geographically close. A higher antenna, however, has the potential to affect a larger number of LMS operations. The Commission concluded that the power adjustment assures that between 5 and 15 meters, an outdoor antenna has the equivalent effect on multilateration LMS operations of an antenna five meters high using no more than 1 watt transmitter output power. We continue to believe that these specifications appropriately balance the interests of all the parties in minimizing interference.

35. We do not believe, as Metricom suggests, that the term "final link" in Section 90.361(c)(2)(ii)(B) of the Commission's rules requires clarification. Metricom asserts that the meaning of "final link" is open to interpretation because the Commission does not define the term. Metricom proposes that it be read as encompassing the entire complement of Part 15 devices that carries, or is available to carry, communications ultimately intended for entities eligible under Subparts B or C of Part 90 of the Rules. However, what Metricom proposes would in fact expand the definition of "final link" beyond its intended scope. The term "final link" is that link in a communications system which terminates with the Part 15 device used by or within the control of the Subpart B or C eligible entity. The term does not apply to other links in the system used to support such communications, e.g., intermediate links or links used by non-Subpart B or C entities. Therefore, we decline to expand the list of operations included under "final link" as proposed by Metricom.

36. We are persuaded by petitioners, however, that we should expand Section 90.361(c)(2)(ii)(B) of the Commission's Rules to include schools, libraries and rural health care providers within the safe harbor, permitting them to employ full power with antennas up to 15 meters. It is apparent from the record that many such institutions, particularly schools, may wish to use Part 15 devices that operate in this band, as well as similar devices that operate in the 5 GHz National Information Infrastructure (NII) band, to connect to the Internet and other on-line resources. In addition to being invaluable research tools, such resources enhance the ability of students, teachers and parents to communicate with one another, as pointed out by the Connectivity for Higher Learning Coalition. We believe that inexpensive access to the national information infrastructure by our nation's educational institutions is of sufficiently significant benefit to the public to warrant special protection for this limited class of Part 15 devices. Further, the universal service provisions of Section 254 of the Communications Act, as amended by the Telecommunications Act of 1996, single out schools, libraries and public or nonprofit health care providers serving residents of rural areas as deserving of special attention so as to enable them to satisfy their communications needs. Accordingly, we will include within the safe harbor elementary and secondary schools, libraries and health care providers for rural areas as defined by Section 254.

37. Further, we recognize that unlike Part 15 devices, the vast majority of which could operate within the safe harbor, amateur radio operations typically would not fit within the safe harbor provisions. Nevertheless, to the extent that amateur operators wish to employ the 902-928 MHz band and to operate within the safe harbor provisions, they should have the same protection as Part 15 devices. Further, we reiterate that failure to fit within the safe harbor provisions does not prevent operations; such operations may continue exactly as before, but are not protected from LMS operators' claims of interference.

38. In addition, AirTouch/Teletrac asks that the Commission clarify whether video links are included in the category of "unprotected" Part 15 devices for purposes of determining eligibility for the safe harbor. They are not. The LMS Report and Order specifically provided that long-range video links will not be permitted to take advantage of the safe harbor. We stated that

"because multilateration entities concur that most Part 15 interference to multilateration LMS systems is likely to be from field disturbance sensors and long range video links, we will not make any presumption of interference-free operations for these devices when they operate in the exclusive-use bands."

--

```
~~~~~
Dewayne Hendricks, WA8DZP ! Internet: dewayne@warpspeed.com
Warp Speed Imagineering ! Packet Radio: WA8DZP @
K3MC.#NOCAL.CA.USA.NOAM
43730 Vista Del Mar ! WWW:
<http://www.warpspeed.com/>
Fremont, CA 94539-3204 !
Fax: (510) 770-9854 !
~~~~~
```

---

## 45. r&o

From: Tony McConnell <n3jly@erols.com>  
Date: Wed, 29 Oct 1997 20:47:29 -0500 (EST)  
To: ss@tapr.org  
Message-ID: <199710300147.UAA20460@smtp1.erols.com>  
Rendered body type: text/plain

from Dwayne's post of r&o or mo&o:

However, what Metricom proposes would in fact expand the definition of "final link" beyond its intended scope. The term "final link" is that link in a communications system which terminates with the Part 15 device used by or within the control of the Subpart B or C eligible entity. The term does not apply to other links in the system used to support such communications, e.g., intermediate links or links used by non-Subpart B or C entities. Therefore, we decline to expand the list of operations included under "final link" as proposed by Metricom.

when so much of what has gone on in this arena has been to the benefit of these 'carriers' this seems a serious bust in the chops to metricom. if they can't claim protection from interference to the 'infrastructure' links that use the same freqs as thier end links i think thier stock will plummet.

73 de n3jli

---

## 46. Re: [SS:1785] Excerpts from FCC 97-305

From: wpns@world.std.com (William Smith)  
Date: Thu, 30 Oct 1997 10:12:01 -0500 (EST)  
To: ss@tapr.org  
Message-ID: <199710301512.AA21283@world.std.com>  
Rendered body type: text/plain

Dewayne sent us a fascinating M0&0 about operation in the 915 MHz band, fo anyone who can parse it better than I, I've got a few questions:

I've got a 915.00 MHz FM ATV transmitter running about 8 watts on a "robot" I built for investigation of Simulated Lunar Teleoperations. If I operate it indoors or outdoors with an antenna height of around 1 meter am I considered to be in the safe harbor, or do I need to reduce my transmitter power to 1 watt, or use a real commercial part15 device?

Thanks!

--

Willie Smith wpns@world.std.com N1JBJ@amsat.org  
#define NII Information SuperCollider

---

# November 1997

Original source file: ss.9711

Source: [http://ftp.tapr.org/tapr\\_history/SIG\\_Archives/spread-spectrum-sig/mail\\_archive/ss.9711](http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9711)

## 1. Web Promotion Spider

From: HappyAgent@hotmail.com  
Date: Sat, 1 Nov 1997 21:26:14 -0600  
To: <ss@tapr.org>  
Message-ID: <199711020326.VAA31253@linux1.pdq.net>  
Rendered body type: text/plain

Automate your site registration with 300+ Search Engines!!  
For only \$49.95 you can buy the software that can put you in the top 100!!

\*\*\*\*\*  
<http://www.marketcom.com/MySpiderSite/welcome.htm>

## 2. Re: [SS:1788] Web Promotion Spider

From: Paul A Beltrani <beltrani@hawaii.edu>  
Date: Sat, 1 Nov 1997 21:54:52 -1000  
To: ss@tapr.org  
Message-ID: <Pine.GS0.3.95q.971101215019.14522A-100000@uhunix4>  
Rendered body type: text/plain

On Sat, 1 Nov 1997 a spammer wrote:

> Automate your site registration with 300+ Search Engines!!  
> For only \$49.95 you can buy the software that can put you in the top 100!!  
> ... www.marketcom.com ...

The upstream provider for Marketcom (marketcom.com)  
is Anawave Software (anawave.com)

Internic lists the toll free number  
for Anawave Software as : 800 711-6030

Please call them during CA business hours and let them  
them know that they are providing services for someone  
who spams net lists. Reputable ISP's do not condone  
this type of netabuse. Please be polite and  
do NOT give them your email address.

- Paul Beltrani, AH6NU

## 3. Re: [SS:1789] Re: Web Promotion Spider

From: N8BLK@aol.com  
Date: Sun, 2 Nov 1997 12:21:34 -0500 (EST)  
To: ss@tapr.org  
Message-ID: <971102120951\_-1307479865@emout03.mail.aol.com>  
Rendered body type: text/plain

In a message dated 97-11-02 03:37:58 EST, you write:

> Please call them during CA business hours and let them  
> them know that they are providing services for someone  
> who spams net lists. Reputable ISP's do not condone  
> this type of netabuse. Please be polite and  
> do NOT give them your email address.

I'd also suggest calling from a payphone as all calls to an 800 or 888  
number are recorded and provided to verify billing. I doubt you  
want more sales phone calls either. -art clemons-

## 4. Wavelan (2.4 GHz) at 100 KM/Hr?

From: Darryl Smith <vk2tds@ozemail.com.au>  
Date: Sun, 02 Nov 1997 15:58:11 +1100  
To: ss@tapr.org  
Message-ID: <345C0863.B089417B@ozemail.com.au>  
Rendered body type: text/plain

Hi there... Whilst I was in the USA I nuked my Linux HD. When I contacted a  
friend at work to get some help to fix it, he mentioned that he is working on a  
solar car project for Uni.

He is wanting to use the WAVELAN (or similar) card for telemetry. Is this

completely stupid at these speeds? According to LEE's book on mobile cellular communications rayleigh fading will occur, and will increase with frequency and speed.

Questions...

- a) If DSSS better under these conditions than FHSS?
- b) Is it totally stupid to use such a link at such speeds (bit rate and ground speed)
- c) Is the performance whilst moving much better for wavelan (or similar) at 900 MHz rather than 2.5 GHz?

Many thanks

Darryl Smith, VK2TDS

---

## 5. Signoff

From: "Frederick M. Spinner" <fred@tekdata.com>  
Date: Mon, 3 Nov 1997 09:23:23 -0600 (CST)  
To: ss@tapr.org, dsp@tapr.org  
Message-ID: <Pine.LNX.3.95.971103091112.15304B-100000@tekdata.com>  
Rendered body type: text/plain

Sorry to tie up the bandwidth, but I've tried multiple times and ways to unsubscribe to these lists (via e-mail listproc signoff messages, and from the TAPR web site). I'm changing employers, and moving, so I really need these lists turned off.

P.S. the signoffs to APRSSIG and MIC-E worked.

Thanks.

Fred M. Spinner, KA9VAW

---

## 6. Re: [SS:1792] Signoff

From: N7PWW@aol.com  
Date: Tue, 4 Nov 1997 19:40:47 -0500 (EST)  
To: ss@tapr.org  
Message-ID: <971104193753\_-1744716128@mrin41.mail.aol.com>  
Rendered body type: text/plain

I'm having the same problem. How to unsubscribe.  
N7PWW

---

## 7. Re: [SS:1793] Re: Signoff

From: Bob Nielsen <nielsen@primenet.com>  
Date: Tue, 4 Nov 1997 19:43:59 -0700 (MST)  
To: N7PWW@aol.com  
Cc: ss@tapr.org  
Message-ID: <Pine.LNX.3.96.971104194141.977D-100000@nielsen.tus.primenet.com>  
Rendered body type: text/plain

On Tue, 4 Nov 1997 N7PWW@aol.com wrote:

> I'm having the same problem. How to unsubscribe.

Per the help file, send a message to 'listproc@tapr.org' with the following text in the body of the message:

unsubscribe <list>

-OR-

signoff <list>

----

|             |                                                                                 |
|-------------|---------------------------------------------------------------------------------|
| Bob Nielsen | Internet: nielsen@primenet.com                                                  |
| Tucson, AZ  | AMPRnet: w6swe@w6swe.ampr.org                                                   |
|             | <a href="http://www.primenet.com/~nielsen">http://www.primenet.com/~nielsen</a> |

---

## 8. New TAPR Weg Pages On-Line

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Mon, 10 Nov 1997 14:34:05 -0600  
To: " Spread Spectrum "<ss@tapr.org>  
Message-ID: <v03110705b08d1aceeb88@[208.134.134.40]>  
Rendered body type: text/plain

Finally had a chance to get all the various things from the DCC on-line.



Two items of specific interest to this group will be:

<http://www.tapr.org/tapr/html/taprfhss.html>

which is the TAPR FHSS Project Page. Contains the paper presented at the DCC, audio of that paper presentation, audio from the segment during the SS Seminar on Sunday covering the radio, and two quicktime movies with Bob Stricklin showing off the alpha boards and one discussing issues and concepts.

The second is

<http://www.tapr.org/dcc>

All the audio from the various presentations are on-line as well as photos from the DCC. The entire Sunday SS seminar audio and overheads are up, except Dewayne's which I am expecting today.

Have fun. Lots of good information presented.

Cheers - Greg

-----

Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>

---

## 9. FHSS Radio Questions

From: RLANIER@mailb.harris.com (RLANIER)  
Date: Sat, 15 Nov 1997 17:32:23 -0500  
To: ss@tapr.org  
Message-ID: <46e52060@mailb.harris.com>  
Rendered body type: text/plain

Hi all,

Since this list has been quite lately, I thought I would through out some questions on this new radio from TAPR ...

I was reading through the FHSS radio design paper written by Tom McDermott, et al, and have a few questions:

- 1) Is the 100:1 spreading ratio stated in the paper due to the fact that the dwell time on each slot is 10 ms?
- 2) Why did the strong narrow-band carriers in Dallas render the part-15 DSSS radios inoperative?
- 3) Why not utilize a full-duplex system?

Tony KE4AT0

---

## 10. Re: [SS:1796] FHSS Radio Questions

From: Dave Koberstein <davek@komacke.com>  
Date: Sun, 16 Nov 1997 00:22:41 -0800  
To: ss@tapr.org  
Message-ID: <199711160823.AAA02639@komacke.com>  
Rendered body type: text/plain

Hi Tony,

- 1) The spreading ratio in FHSS would be do to the number of frequencies, not the duration of time spent on each frequency.
- 2) Not familiar with the example. However, I suspect it underscores the difference between FHSS and DSSS. In DSSS, if the narrow band interferor exceeds the processing gain ( $10 \cdot \log(\text{number-of-chips})$ ), it fails catastrophically. For FHSS, it fails only for that frequency - excluding adjacent-channel effects in the receiver.
- 3) Full duplex implies Tx is on a different frequency than Rx. This independent from DSSS/FHSS.

Davek

At 08:18 PM 11/15/97 -0600, you wrote:  
> Hi all,

```

>
> Since this list has been quite lately, I thought I would through out
> some questions on this new radio from TAPR ...
>
> I was reading through the FHSS radio design paper written by Tom
> McDermott, et al, and have a few questions:
>
> 1) Is the 100:1 spreading ratio stated in the paper due to the fact
> that the dwell time on each slot is 10 ms?
>
> 2) Why did the strong narrow-band carriers in Dallas render the
> part-15 DSSS radios inoperative?
>
> 3) Why not utilize a full-duplex system?
>
>
> Tony KE4AT0
> > ----- End of Original -----

```

---

Dave Koberstein  
 keep in touch: davek@komacke.com / www.komacke.com  
 work: davek@proxim.com / www.proxim.com  
 ham internet: n9dk@n9dk.ampr.org [44.4.12.172]  
 (ax.25/PBBS: n9dk@w6yx.#nocal.ca.usa.noam)

## 11. FHSS Radio Questions

From: John Scott <kd4vhg@radio.org>  
 Date: Sun, 16 Nov 1997 12:05:01 -0500  
 To: ss@tapr.org  
 Message-ID: <346F27BD.4AAF@radio.org>  
 Rendered body type: text/plain

I have two questions about the FHSS radio.

1. Any chance of getting a RS232 serial port? I can think of a couple of applications that I don't have ethernet capability, but would like to have a high throughput data link ( >19200 ).

2. Any ideas yet of what these units may cost? I understand that it is still early in the development, but I would like to know if I need to sell my car to afford a couple of these radio's.

Thanks a lot, it sounds like a great project.

-John Scott  
 kd4vhg

## 12. Re: [SS:1798] FHSS Radio Questions

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
 Date: Sun, 16 Nov 1997 11:49:01 -0600  
 To: ss@tapr.org  
 Message-ID: <v03110706b094e1ef2e89@[208.134.134.40]>  
 Rendered body type: text/plain

>I have two questions about the FHSS radio.

>

>1. Any chance of getting a RS232 serial port? I can think of a couple  
 >of applications that I don't have ethernet capability, but would like to  
 >have a high throughput data link ( >19200 ).

On the current project no.

>2. Any ideas yet of what these units may cost? I understand that it is  
 >still early in the development, but I would like to know if I need to  
 >sell my car to afford a couple of these radio's.

Details as they stand are on <http://www.tapr.org/tapr/html/fhss.html>

There will be no cost or delivery details for sometime.

> it sounds like a great project.

Yes and we have a bunch of good folks working on it.

Although just becuase we have one project going, we need to be doing other things as well.

We are looking at doing some with a WaveLAN OEM board, but if anyoe else on

the list have thoughts about equipment that might be available to people  
.... let everyone on the list know. We have a lot of people wanting to get  
on the air with something, but don't have anything yet.

The TAPR FHSS Radio Project is many months away from being available to  
everyone.

Cheers - Greg

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>

---

### 13. Re: [SS:1798] FHSS Radio Questions

From: Jeff King <jeff@mich.com>  
Date: Sun, 16 Nov 1997 15:32:10 -0500  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19971116153210.0373f2c0@mail.mich.com>  
Rendered body type: text/plain

At 11:20 AM 11/16/97 -0600, John Scott wrote:

>I have two questions about the FHSS radio.

>

>1. Any chance of getting a RS232 serial port? I can think of a couple  
>of applications that I don't have ethernet capability, but would like to  
>have a high throughput data link ( >19200 ).

Check out the FreeWave radios, they have a RS-232 port which will go up  
to 230kbps. They are at <http://www.freewave.com>

Regards,

-----  
| Jeff King           Aero Data Systems |  
| jeff@mich.com     P.O. Box 510895   |  
| (810)471-1787     Livonia, MI 48151 |  
| F(810)471-0279    United States     |  
-----

---

### 14. RE: 1796] FHSS Radio Questions

From: Tom McDermott <mcdermot@aud.alcatel.com>  
Date: Sun, 16 Nov 1997 17:30:10 -0600  
To: "'Greg Jones'" <wd5ivd@tapr.org>, "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <01BCF2B5.4AA8A560.mcdermot@aud.alcatel.com>  
Rendered body type: text/plain

Greg: apparently I am not on the TAPR SS list.

Tom McDermott  
mcdermot@aud.alcatel.com

-----Original Message-----

From: ss@tapr.org [SMTP:ss@tapr.org]  
Sent: Saturday, November 15, 1997 10:15 PM  
To: Tom McDermott  
Subject: [SS:1796] FHSS Radio Questions

Tom --- are you on the TAPR SS list ?

Greg

-----

Hi all,

Since this list has been quite lately, I thought I would through out  
some questions on this new radio from TAPR ...

I was reading through the FHSS radio design paper written by Tom  
McDermott, et al, and have a few questions:

1) Is the 100:1 spreading ratio stated in the paper due to the fact  
that the dwell time on each slot is 10 ms?

2) Why did the strong narrow-band carriers in Dallas render the part-15 DSSS radios inoperative?

3) Why not utilize a full-duplex system?

Tony KE4AT0

---

## 15. Re: [SS:1796] SS digest 428

From: Darryl Smith <vk2tds@ozemail.com.au>  
Date: Mon, 17 Nov 1997 11:53:56 +1100  
To: ss@tapr.org  
Message-ID: <346F95A4.7BE3763E@ozemail.com.au>  
Rendered body type: text/plain

> 2) Why did the strong narrow-band carriers in Dallas render the  
> part-15 DSSS radios inoperative?

SS will only give an advantage from narrow band of the spreading gain.  
Therefore if we get a powerful transmitter much closer than the SS transmitter  
it will swamp the signal. Also the narrow band signal will increase the error  
rate on the channel.

>  
>  
> 3) Why not utilize a full-duplex system?

Full duplex requires either a 30db maximum transmit/recieve signal difference  
if transmitting on the same frequency at the same time, or operating on two  
frequencies. The two frequencies really need to be on different bands too.

The problem is that this really creates a problem creating a network rather  
than a collection of links. In a multi-point to central point, or multi-point  
to multi-point network half duplex is the only way to go (for more reasons  
look at my thesis on the TAPR www site).

Darryl Smith VK2TDS  
[Attachment: smime.p7s; application/x-pkcs7-signature; 4,258 bytes]

---

## 16. Ethernet MAC

From: "Lee W. Fry" <lfry@mindspring.com>  
Date: Mon, 17 Nov 1997 05:25:45 -0500  
To: ss@tapr.org  
Message-ID: <2.2.32.19971117102545.00da9b7c@mindspring.com>  
Rendered body type: text/plain

Ran across an interesting "glue" chip while trying to fix up some broken  
links on my web site.

ATMEL MAC 110 Ethernet media access controller:

<http://www.atmel.com/atmel/acrobat/doc0879.pdf>

AA0JP

---

## 17. Another FHSS radio question

From: LNUSSAT.JMALMBER@eds.com  
Date: Mon, 17 Nov 1997 13:26:52 -0500  
To: ss <ss@tapr.org>  
Message-ID: <0095000006169674000002L042\*@MHS>  
Rendered body type: text/plain

The article on the TAPR web page indicated that the radio links supported would  
be point to point only.

Am I correct in understanding that a repeater would require 1 tranceiver for  
each pair of stations that is attempting  
to use it?

The terrain here in middle Tennessee has a lot of hills. I am trying to  
understand how badly this would affect the amateur  
stations in the area.

When the FHSS kit is available, is it possible that a thinwire ethernet to  
twisted pair adapter can also be sourced as an option. At the size of my  
network, thinwire is much more economical than twisted pair, as I do not have  
the cost of a hub.

As far as Scott's request about adapting a serial device to an ethernet port, there are two main options:

1. Use a PC. Ethernet cards for 8088 and above can be had for \$15.00 in some of the catalogs that I get. You can probably find an old 386 pc cheap. Use your choice of O.S.
2. Several vendors sell such an adaptor in multiport and single port units. You can probably find a lot of them on the used market. Some vendor names are EMULEX, XYPLEX, LANTRONICS, ABLE, DIGITAL. Make sure that the unit supports TCP/IP. Beware, some units require a host download when they power up before they can function.

In my case the ethernet interface makes it easier for me to connect my host. This brings up another question.

Will special drivers be needed to connect to the FHSS radio, or will standard TCP/IP be able to be used?  
My host system can not run Intel binaries for device drivers.

Regards, John Malmberg  
WB8TYW @K4HRY.#MIDTN.TN.USA

E-Mail: lnussat.jmalmber@gmeds.com

---

## 18. RE: [1796] FHSS Radio Questions

From: Tom McDermott <mcdermot@aud.alcatel.com>  
Date: Mon, 17 Nov 1997 12:48:26 -0600  
To: "'ss@tapr.org'" <ss@tapr.org>  
Cc: "'mcdermot@aud.alcatel.com'" <mcdermot@aud.alcatel.com>  
Message-ID: <01BCF357.19948780.mcdermot@aud.alcatel.com>  
Rendered body type: text/plain

Greg has been kind enough to subscribe me to this list. Tony asks some questions regarding our FHSS design experience. I'll try to answer them as best I can.

Tom McDermott  
mcdermot@aud.alcatel.com

-----

Hi all,

Since this list has been quite lately, I thought I would throw out some questions on this new radio from TAPR ...

I was reading through the FHSS radio design paper written by Tom McDermott, et al, and have a few questions:

- 1) Is the 100:1 spreading ratio stated in the paper due to the fact that the dwell time on each slot is 10 ms?
- 2) Why did the strong narrow-band carriers in Dallas render the part-15 DSSS radios inoperative?
- 3) Why not utilize a full-duplex system?

Tony KE4ATO

1) We do not mention use of 100:1 spreading code for the FHSS design. The FHSS design occupies about 600 Khz of spectrum, when divided into 26 Mhz available in the 915 Mhz Amateur band; that yields about 43 available channels. Spreading gain is usually computed on DSSS systems as the ratio of the chip rate to the data rate. With the slow-hopper design we are using, there is not any really meaningful way to express spreading gain.

2) Since the narrow-band carriers are on the order of 50 dB stronger than the DSSS radios, and the part-15 DSSS radios only have about 11 dB of spreading gain, the strong narrowband signals simply are stronger than the desired signal, even after despread the desired signal. Converting to horizontal polarization helps about 20 dB., but this still leaves DSSS at a 50-(20+11) = 19 dB negative C/I ratio in the baseband when you put the DSSS units a couple miles apart. DSSS can provide good interference rejection but only when the

bit rate is drastically reduced (like: 500 bits/sec), when the bandwidth is spread (like: 12 Ghz), when the units are very close together (like: < 2 miles), when adaptive RF notches are designed into the receiver front-end (like: really complicated), or when the strong carriers are avoided (like: luck).

3) Cost. Full-duplex means either that in-band SS is required which needs ridiculously difficult filters (since the objective is to spread out into as much of the band as possible). Or different bands are utilized. In either case the cost and difficulty of implementation go up correspondingly. Half duplex is a lot cheaper and easier to make run for the user of the equipment.

---

## 19. RE: 1804] Another FHSS radio question

From: Tom McDermott <mcdermot@aud.alcatel.com>  
Date: Mon, 17 Nov 1997 16:08:15 -0600  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <01BCF373.03B1BDE0.mcdermot@aud.alcatel.com>  
Rendered body type: text/plain

I can give my views on the questions: Bob or Bill may have different opinions...

The system is designed so that one transceiver is required for each pair of stations simultaneously occupying the link for a session plus one control channel (needed in multichannel case). Thus, for 3 simultaneously active stations, 4 channels are needed. Simultaneously means having a session alive. It's possible to pack more in there (i.e. reclaiming idle channel space during active sessions), but it gets really complicated... and should be deferred to a later release

The hub is designed to support re-use of channel radios based on sharing. When a new session is to be established, the request is made on the control channel, and if an idle channel is available, it is assigned. Then it is busy until that session is over.

Trying to share one transceiver pair among a multi-party session results in terrible performance. Commercial part-15 units exhibit this behavior also. You can get equivalent performance at between 1200 and 9600 baud, so it's not worth the trouble. Since the session parameters are in software, nothing in the hardware limits this, but it is intended that the initial release will not support single radio multi-party operation. Heck, I cant even promise multi-channel single party will be in the initial release since I'm not writing the code. Anything else is in the future.

As for thinwire Ethernet, adaptors are readily available for conversion. Almost all current NIC adaptors come with 10-base-T. You can purchase cross-over cables (like a null modem) if you just want to tie one computer to one radio without a hub (CompUSA has them).

In the initial release, the radio will just be an IP-extension pipe. Anything beyond that should be considered a bonus from the software team. In that case, I show my ignorance in that I do not understand the 'special drivers' question. I think you should be able to run TCP/IP (or UDP/IP) or (anything/IP) as you desire. It is a local configuration option on how to set up IP addressing - static or dynamic. I recommend using a host supporting DHCP, since Win 95 supports it right out of the box, and you don't have to hassle with assigning IP addresses.

Tom McDermott  
mcdermot@aud.alcatel.com

-----Original Message-----

From: LNUSSAT.JMALMBER@eds.com [SMTP:LNUSSAT.JMALMBER@eds.com]  
Sent: Monday, November 17, 1997 12:40 PM  
To: ss@tapr.org  
Subject: [SS:1804] Another FHSS radio question

The article on the TAPR web page indicated that the radio links supported would be point to point only.

Am I correct in understanding that a repeater would require 1 transceiver for each pair of stations that is attempting to use it?

The terrain here in middle Tennessee has a lot of hills. I am trying to understand how badly this would affect the amateur stations in the area.

When the FHSS kit is available, is it possible that a thinwire ethernet to twisted pair adapter can also be sourced as an option. At the size of my network, thinwire is much more economical than twisted pair, as I do not have the cost of a hub.

As far as Scott's request about adapting a serial device to an ethernet port, there are two main options:

1. Use a PC. Ethernet cards for 8088 and above can be had for \$15.00 in some of the catalogs that I get. You can probably find an old 386 pc cheap. Use your choice of O.S.
2. Several vendors sell such an adaptor in multiport and single port units. You can probably find a lot of them on the used market. Some vendor names are EMULEX, XYPLEX, LANTRONICS, ABLE, DIGITAL. Make sure that the unit supports TCP/IP. Beware, some units require a host download when they power up before they can function.

In my case the ethernet interface makes it easier for me to connect my host. This brings up another question.

Will special drivers be needed to connect to the FHSS radio, or will standard TCP/IP be able to be used?  
My host system can not run Intel binaries for device drivers.

Regards, John Malmberg  
WB8TYW @K4HRY.#MIDTN.TN.USA

E-Mail: lnussat.jmalmber@gmeds.com

---

## 20. Re: [SS:1804] Another FHSS radio question

From: gregory.beat@mediaone.net  
Date: Mon, 17 Nov 1997 22:16:32 -0600  
To: ss@tapr.org  
Message-ID: <347116A0.1AF199C6@mediaone.net>  
Rendered body type: text/plain

LNUSSAT.JMALMBER@eds.com wrote:

- > When the FHSS kit is available, is it possible that a thinwire
- > ethernet to
- > twisted pair adapter can also be sourced as an option. At the
- > size of my
- > network, thinwire is much more economical than twisted pair, as
- > I do not have
- > the cost of a hub.

You will find a large number of media adapters for Ethernet on the open market and surplus. The only expensive one that I ever bought was for FOIRL (Fiber Optic Ethernet - now known as 10-Base-F or FL) and that was around \$ 250.00. The 10-Base-2 (Thin net) and 10-Base-5 (Thick net) to 10 Base-T (Twisted pair) can be found at a good computer/network swapfest --- at hamfests I sometimes find surplus -- but varies alot.

- > As far as Scott's request about adapting a serial device to an
- > ethernet port,
- > there are two main options:
- >
- > 1. Use a PC. Ethernet cards for 8088 and above can be had for
- > \$15.00 in some
- > of the catalogs that I get. You can probably find an old 386
- > pc cheap. Use
- > your choice of O.S.

I would hate to tell you how many times I have seen customers and clients throw in the garbage working Ethernet cards that are 10-Base-2 (Thin net) or the older 8-bit style network interface cards.

- > 2. Several vendors sell such an adaptor in multiport and single
- > port units.
- > You can probably find a lot of them on the
- > used market. Some vendor names are EMULEX, XYPLEX, LANTRONICS,
- > ABLE, DIGITAL.
- > Make sure that the unit
- > supports TCP/IP. Beware, some units require a host download
- > when they power up
- > before they can function.

Also called "Terminal Servers" and are used to support serial devices (i.e. hospital lab instruments, serial video terminals, serial printers, modems). Most will support TCP/IP protocols (telnet, SLIP, PPP), but earlier versions as earlier pointed out --- will only support the DECnet/LAT protocols or have very little on-board intelligence and require a "bootp" server for operation. I use to see quite a few of them at hamfests a few years ago ---- hospital and university surplus is an excellent scouting area.

GB

---

## 21. Spread Spectrum... Multi-point links

From: Darryl Smith <vk2tds@ozemail.com.au>  
Date: Tue, 18 Nov 1997 22:37:33 +1100  
To: ss@tapr.org  
Message-ID: <34717DFC.DA1D09FC@ozemail.com.au>  
Rendered body type: text/plain

It seems to me that with a bit of work with software the unit would support multi-point links, as well as allowing a repeater... It would be a bizzare protocol, but i would love to have a go at it :-)

It would not be the ideal way to run the protocol, but it would be possible

Sydney would need this. We are the world's worst cellular communications city, large physically with few users, hilly, barren, trees etc etc etc... Basically the TAPR SS board with software could be configured as a full interconnectedd network

Darryl VK2TDS  
[Attachment: smime.p7s; application/x-pkcs7-signature; 4,258 bytes]

---

## 22. Re: [SS:1806] RE: 1804] Another FHSS radio question

From: LNUSSAT.JMALMBER@eds.com  
Date: Tue, 18 Nov 1997 11:34:15 -0500  
To: ss <ss@tapr.org>  
Message-ID: <00950000006223998000002L082\*@MHS>  
Rendered body type: text/plain

The twisted pair lan adapter is not available for the host system that I am using. It does not use PC compatable circuit cards.

For small LANs that are greater than 2 nodes, such as the 4 node LAN that I have at the Ham shack, thinwire is more economical than buying a twisted pair hub. An SS radio would be the 5th item on the network unless I rig up a router.

The lowest price that I can find for a twisted pair to thin-wire adapter is \$50.00. It is also a 4 port thinwire hub. Since combo ethernet cards can be obtained for less than that, I was looking for a cheaper alternative.

If the majority of stations out there are just single nodes connected to the radio, then it does not make sense to add to the cost and complexity of the unit.

Also, does this system relay everything that it sees on the ethernet, or does it only recognize the TCP/IP protocol?

I guess my previous assumptions is that it would look like a gateway to the host system, not just a passive repeater.

Some ballpark bugeting estimates would also be helpful for us locally to plan our migration to higher speeds.

My host also currently does not support DHCP. Since my IP stack is Carnige-Mellon-Univ. IP and it came with source code, I should be able to fix it to be either a client or a server.

Regards, John Malmberg  
WB8TYW @K4HRY.#MIDTN.TN.USA

E-Mail: lnussat.jmalMBER@gmeds.com



### 23. RE: [1809] Another FHSS radio question

From: Tom McDermott <mcdermot@aud.alcatel.com>  
Date: Tue, 18 Nov 1997 23:53:13 -0600  
To: "'ss@tapr.org'" <ss@tapr.org>  
Cc: "'bbswg4@tapr.org'" <bbswg4@tapr.org>  
Message-ID: <01BCF47D.2234B460.mcdermot@aud.alcatel.com>  
Rendered body type: text/plain

john:

We had 'gobs' of the little 10-base-2 to 10-base-T adaptors around here when we converted from coax to 10-base-T. Incidentally, our network with 10-base-T works vastly better than before due to the improved fault isolation of 10-base-T. The adaptors should be available surplus from many places (but actually I have not tried to find them).

The simple adaptors we used were very inexpensive, and did not have any hub functions associated with them. All you need is one on the radio end, and adapt it to the 10-base-2 coax. You can leave the rest of your network as 10-base-2. It is difficult to justify putting hardware for both 10-base-2 and 10-base-T on every radio when it will only be used by a few. Also, it makes the board layout extremely difficult. We are looking towards the future with this radio, and that I think means 10-base-T.

If you do not have DHCP, then just use static IP addressing. However it's just a royal pain when lots of different people can connect to your radio and you have to administer all the addresses. If it's your own private network, then no big deal of course.

Release 1 of the radio is just an IP extension cord. Putting a full TCP/IP stack into the radio is a significant software effort, plus a stack has to be licensed, paid for, etc. So, it's not likely to be there unless some miracle happens.

Tom McDermott  
mcdermot@aud.alcatel.com

-----Original Message-----

From: LNUSSAT.JMALMBER@eds.com [SMTP:LNUSSAT.JMALMBER@eds.com]  
Sent: Tuesday, November 18, 1997 10:55 AM  
To: ss@tapr.org  
Subject: [SS:1809] RE: 1804] Another FHSS radio question

The twisted pair lan adapter is not available for the host system that I am using. It does not use PC compatible circuit cards.

For small LANs that are greater than 2 nodes, such as the 4 node LAN that I have at the Ham shack, thinwire is more economical than buying a twisted pair hub. An SS radio would be the 5th item on the network unless I rig up a router.

The lowest price that I can find for a twisted pair to thin-wire adapter is \$50.00. It is also a 4 port thinwire hub. Since combo ethernet cards can be obtained for less than that, I was looking for a cheaper alternative.

If the majority of stations out there are just single nodes connected to the radio, then it does not make sense to add to the cost and complexity of the unit.

Also, does this system relay everything that it sees on the ethernet, or does it only recognize the TCP/IP protocol?

I guess my previous assumptions is that it would look like a gateway to the host system, not just a passive repeater.

Some ballpark bugeting estimates would also be helpful for us locally to plan our migration to higher speeds.

My host also currently does not support DHCP. Since my IP stack is Carnegie-Mellon-Univ. IP and it came with source code, I should be able to fix it to be either a client or a server.

Regards, John Malmberg

---

## 24. Re: [SS:1810] RE: [1809] Another FHSS radio question

From: mdmiller@onramp.net  
Date: Wed, 19 Nov 1997 07:03:10 -0600  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19971119070310.00954e40@199.1.11.3>  
Rendered body type: text/plain

At 12:05 PM 11/18/97 -0600, Tom McDermott wrote:  
>Release 1 of the radio is just an IP extension cord. Putting a full TCP/IP stack into the radio is a significant  
>software effort, plus a stack has to be licensed, paid for, etc. So, it's not likely to be there unless some  
>miracle happens.

Tom, would you explain IP extension cord? What IP address will be in the radio.

73  
Mark Miller  
N5RFX

---

## 25. RE: 1811] RE: [1809] Another FHSS radio question

From: Tom McDermott <mcdermot@aud.alcatel.com>  
Date: Wed, 19 Nov 1997 23:09:23 -0600  
To: "'ss@tapr.org'" <ss@tapr.org>  
Cc: "'bbswg4@tapr.org'" <bbswg4@tapr.org>  
Message-ID: <01BCF540.2D25DF20.mcdermot@aud.alcatel.com>  
Rendered body type: text/plain

Mark: in the initial release, the radio will probably not have an IP address. This is the same as your 10-base-T electrical cable not having an IP address. The computers on either end of the cable have addresses, but the cable itself does not. Similarly, in the initial release, the radio does not have to have an address, as it functions like a cable (hence the terminology 'extension-cord').

However, all Ethernet devices have a permanent, global 48-bit address. In this case, the radio must have an Ethernet address, even though it does not have to have an IP address. The Ethernet address is a layer-2, or 'MAC' address, while IP is a layer-3 address.

Now, if our software team pulls off a miracle, gets a free stack, etc., well then more options are possible. However, it is most important that the initial software release of the radio be as simple as possible, and descopeing features in R1.0 is usually the name of the game (especially in the commercial world).

Tom McDermott  
mcdermot@aud.alcatel.com

-----Original Message-----

From: mdmiller@onramp.net [SMTP:mdmiller@onramp.net]  
Sent: Wednesday, November 19, 1997 10:14 AM  
To: ss@tapr.org  
Subject: [SS:1811] RE: [1809] Another FHSS radio question

At 12:05 PM 11/18/97 -0600, Tom McDermott wrote:  
>Release 1 of the radio is just an IP extension cord. Putting a full TCP/IP stack into the radio is a significant  
>software effort, plus a stack has to be licensed, paid for, etc. So, it's not likely to be there unless some  
>miracle happens.

Tom, would you explain IP extension cord? What IP address will be in the radio.

73  
Mark Miller  
N5RFX

---

## 26. DTV & SS

From: N5RG@aol.com  
Date: Wed, 19 Nov 1997 12:23:39 -0500 (EST)

To: ss@tapr.org  
Message-ID: <971119122338\_866936458@mrin84.mail.aol.com>  
Rendered body type: text/plain

Fellow Hams:

The past several months I have been trying to help a local Christian TV station with it's technical problems. In the process I have met several of the broadcast engineers and technicians in this area who have been telling me about one of their big concerns--HDTV or DTV. The Congressional mandate requiring all TV broadcasting to be in the form of DTV by 2006 (I believe this is the correct date) is causing great concerns to the broadcasting industry since this will require scaping the mode they have been using for the past 50 years and having to redo everything. The cost of new transmitters, transmitting towers and antennas amounts to several millions of dollars for each station, not to mention cameras, recorders, Studio-Transmitter Links, etc.

One engineer told me the other day they thought, that to maintain the same coverage area they currently have, they will have to increase their transmitter power by 3 times. If all five of the high power TV transmitters at this site increase their power by three times, there will not be nearly enough primary power coming through the Idaho Power lines feeding the site to supply the power needed. Idaho Power estimates it will cost one million dollars to install the additional power lines needed to supply the increased load.

I had the thought that perhaps the way the TV industry has chosen to broadcast DTV is obsolete before they even start. Instead of continuing to broadcast using 6 Mhz channels, perhaps they should use Spread Spectrum spread over the whole UHF band. It seems to me this could result in a reduction in transmitter power of at least 10 db. I am sure there must be some good reasons why this is not a good idea. Perhaps the receivers would be to expensive, etc.

This is an academic question since the TV industry is already poised to to use narrow band technology. But I am curious as to what you experts think about the possibilities of using SS to transmit Digital Television.

What are your thoughts?

Roy W7IDM, ex N5RG

---

## 27. FHSS Question

From: Guy Story <GStory@icomply.com>  
Date: Wed, 19 Nov 1997 13:10:06 -0600  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <c=US%a=%p=LEW%l=LEW\_PRODS1-971119191006Z-1095@lew\_prods1.icomply.com>  
Rendered body type: text/plain

Hello Tom. I may have missed something but I have got a question from a nonengineer standpoint. I realize and am not worried about getting a 10-base-T card for my PC, what else am I going to need? My intenion is to use JNOS to act as a gateway in Denton,Tx. This may or may not happen. Either way I wont loose any sleep. I am entering this in a very basic level thus I am new to everything the group has been discussing. That is the main reason I want to participate. I have not had time to check the TAPR site for the DCC papers.

Guy Story  
International Compliance Corporation  
802 N. Kealy  
Lewisville, TX 75057-3136  
voice: 972.436.9600  
fax: 972.436.2667  
email: gstory@icomply.com  
webpage: <http://www.icomply.com>  
"These are my views not necessarily my employer's views."

---

## 28. Re: [SS:1813] DTV & SS

From: Jeff Morton <jmorton@cmi.csc.com>  
Date: Wed, 19 Nov 1997 13:18:04 CST  
To: ss@tapr.org  
Message-ID: <E0xYFdV-0004cR-00@mercury.csc.com>  
Rendered body type: text/plain

> One engineer told me the other day they thought, that to maintain  
> the same coverage area they currently have, they will have to increase

> their transmitter power by 3 times. If all five of the high power TV  
> transmitters  
> at this site increase their power by three times, there will not be nearly  
> enough primary power coming through the Idaho Power lines feeding the  
> site to supply the power needed. Idaho Power estimates it will cost one  
> million dollars to install the additional power lines needed to supply the  
> increased load.

I'm not seeing why they think they'll need that power increase. If they  
were to broadcast an analog image, the increase in image size would  
probably make the increase in power necessary just to keep the data  
stable, but as far as I am aware, HDTV is a digital standard which uses  
compression techniques to greatly reduce the data needed for transmission,  
allowing transmission over a smaller spectrum for the same quantity of  
data. Am I mistaken as to the HDTV you're referring to?

> I had the thought that perhaps the way the TV industry has chosen to  
> broadcast  
> DTV is obsolete before they even start. Instead of continuing to broadcast  
> using 6 Mhz channels, perhaps they should use Spread Spectrum spread  
> over the whole UHF band. It seems to me this could result in a reduction  
> in transmitter power of at least 10 db. I am sure there must be some good  
> reasons why this is not a good idea. Perhaps the receivers would be to  
> expensive, etc.

The receivers, being the TV set in your house, will already be fairly  
expensive, since they will have a special chipset (actually several),  
used to decode the 7 or so standards embedded within the larger standard.  
As I've been told, they couldn't make up their minds and just go with  
a good MPEG version, but instead different studios forced other proprietary  
formats into the standard, meaning each receiver will require about 7  
chipsets (each proprietary format is on its own chipset) in the receiver.  
Therefore, the cost for a new television will be several hundreds of dollars  
above what it currently is, and a converter receiver box for old TV's, if  
they'll even release them, will be in the hundreds as well.

I don't see SS being a significant addition to the cost of a receiver, when  
you consider the cost increases already incurred. (Then again, I'm not  
sure how much it would cost to outfit one with just the receiver.)

> This is an academic question since the TV industry is already poised to  
> to use narrow band technology. But I am curious as to what you experts  
> think about the possibilities of using SS to transmit Digital Television.

This is also an academic question because the TV industry wouldn't go with  
something simple yet powerful. The latest MPEG format would've let them  
do what they want to, and would have given studios control over the quality  
of the output. The advantage to MPEG is that the encoding is as good as  
you want it to be. If you can afford the top of the line MPEG encoders,  
like a large studio can, the final picture will look just like the  
original to the naked eye at 5 feet, and the compression will be  
outstanding. If you're a basement studio, you can compress it on most  
computers with similar compression ratios, but the picture quality  
will be noticeably degraded.

---

## 29. Re: [SS:1815] Re: DTV & SS

From: John Scott <kd4vhg@radio.org>  
Date: Wed, 19 Nov 1997 15:16:26 -0500  
To: ss@tapr.org  
Message-ID: <3473491A.BDF5BDEC@radio.org>  
Rendered body type: text/plain

Jeff Morton wrote:

> > One engineer told me the other day they thought, that to maintain  
> > the same coverage area they currently have, they will have to increase  
> > their transmitter power by 3 times. If all five of the high power TV  
> > transmitters  
> > at this site increase their power by three times, there will not be nearly  
> > enough primary power coming through the Idaho Power lines feeding the  
> > site to supply the power needed. Idaho Power estimates it will cost one  
> > million dollars to install the additional power lines needed to supply the  
> > increased load.  
>  
> I'm not seeing why they think they'll need that power increase. If they  
> were to broadcast an analog image, the increase in image size would  
> probably make the increase in power necessary just to keep the data  
> stable, but as far as I am aware, HDTV is a digital standard which uses  
> compression techniques to greatly reduce the data needed for transmission,

> allowing transmission over a smaller spectrum for the same quantity of  
> data. Am I mistaken as to the HDTV you're referring to?

The need for increased transmitter power to cover the same geographical area is probably related to the fact that most of the DTV permits granted by the FCC are in the UHF band and not the VHF band. To cover the same area in UHF that you covered in VHF requires more power and/or higher towers.

Stations that were already in UHF don't need to make big power or tower changes with the move to DTV, but stations that were down in the VHF range ( 2 - 13 ), will need to make changes.

-John Scott, KD4VHG  
Currently working at WAGA-TV in Atlanta.

---

### 30. RE: 1814] FHSS Question

From: Tom McDermott <mcdermot@aud.alcatel.com>  
Date: Thu, 20 Nov 1997 02:18:00 -0600  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <01BCF55A.8694ED20.mcdermot@aud.alcatel.com>  
Rendered body type: text/plain

Guy: there's too much to this question to adequately address here. However, the new operating systems like Win 95 have a whole lot of the networking built right in, vastly simplifying the whole process.

The best way to learn is to attend the Texas Packet Radio Society (TPRS) Fall digital Symposium, in Austin, Texas, on December 6th. These topics will be well presented by some knowledgeable folks.

Check out the TPRS web site: <http://www.tprs.org>  
which has maps, directions, agenda, etc.

Best of all, it's free.

Tom McDermott  
mcdermot@aud.alcatel.com

-----Original Message-----

From: Guy Story [SMTP:GStory@icomply.com]  
Sent: Wednesday, November 19, 1997 1:21 PM  
To: ss@tapr.org  
Subject: [SS:1814] FHSS Question

Hello Tom. I may have missed something but I have got a question from a nonengineer standpoint. I realize and am not worried about getting a 10-base-T card for my PC, what else am I going to need? My intention is to use JNOS to act as a gateway in Denton,Tx. This may or may not happen. Either way I wont loose any sleep. I am entering this in a very basic level thus I am new to everything the group has been discussing. That is the main reason I want to participate. I have not had time to check the TAPR site for the DCC papers.

Guy Story  
International Compliance Corporation  
802 N. Kealy  
Lewisville, TX 75057-3136  
voice: 972.436.9600  
fax: 972.436.2667  
email: gstory@icomply.com  
webpage: <http://www.icomply.com>  
"These are my views not necessarily my employer's views."

---

### 31. RE: 1817] RE: 1814] FHSS Question

From: Guy Story <GStory@icomply.com>  
Date: Wed, 19 Nov 1997 16:19:23 -0600  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <c=US%a=\_%p=LEW%l=LEW\_PRODS1-971119221923Z-1198@lew\_prods1.icomply.com>  
Rendered body type: text/plain

Tom, I looked at the site and I got an error when I clicked on the link to the Fall Symposium. I will check it out again when I get home from work, Unless something happens I will see you and Greg there.

Guy Story  
International Compliance Corporation  
802 N. Kealy  
Lewisville, TX 75057-3136  
voice: 972.436.9600

fax: 972.436.2667  
email: gstory@icomply.com  
webpage: <http://www.icomply.com>  
"These are my views not necessarily my employer's views."

>-----  
>From: Tom McDermott[SMTP:mcdermot@aud.alcatel.com]  
>Sent: Wednesday, November 19, 1997 2:32 PM  
>To: ss@tapr.org  
>Subject: [SS:1817] RE: 1814] FHSS Question  
>  
>Guy: there's too much to this question to adequately address here. However,  
>the new operating  
>systems like Win 95 have a whole lot of the networking built right in, vastly  
>simplifying  
>the whole process.  
>  
>The best way to learn is to attend the Texas Packet Radio Society (TPRS) Fall  
>digital  
>Symposium, in Austin, Texas, on December 6th. These topics will be well  
>presented  
>by some knowledgeable folks.  
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>Check out the TPRS web site: <http://www.tprs.org>  
>which has maps, directions, agenda, etc.  
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>Best of all, it's free.  
>  
>Tom McDermott  
>mcdermot@aud.alcatel.com  
>  
>  
>  
>-----Original Message-----  
>From: Guy Story [SMTP:GStory@icomply.com]  
>Sent: Wednesday, November 19, 1997 1:21 PM  
>To: ss@tapr.org  
>Subject: [SS:1814] FHSS Question  
>  
>Hello Tom. I may have missed something but I have got a question from a  
>nonengineer standpoint. I realize and am not worried about getting a  
>10-base-T card for my PC, what else am I going to need? My intention is  
>to use JNOS to act as a gateway in Denton,Tx. This may or may not  
>happen. Either way I wont loose any sleep. I am entering this in a  
>very basic level thus I am new to everything the group has been  
>discussing. That is the main reason I want to participate. I have not  
>had time to check the TAPR site for the DCC papers.  
>Guy Story  
>International Compliance Corporation  
>802 N. Kealy  
>Lewisville, TX 75057-3136  
>voice: 972.436.9600  
>fax: 972.436.2667  
>email: gstory@icomply.com  
>webpage: <http://www.icomply.com>  
>"These are my views not necessarily my employer's views."  
>  
>  
>  
>

---

## 32. Re: [SS:1813] DTV & SS

From: Jeff King <jeff@mich.com>  
Date: Wed, 19 Nov 1997 18:09:12 -0500  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19971119180912.0376c100@mail.mich.com>  
Rendered body type: text/plain  
  
At 11:34 AM 11/19/97 -0600, N5RG@aol.com wrote:

> The Congressional  
>mandate requiring all TV broadcasting to be in the form of DTV by 2006  
>(I believe this is the correct date) is causing great concerns to the  
>broadcasting industry since this will require scaping the mode they have  
>been using for the past 50 years and having to redo everything. The cost  
>of new transmitters, transmitting towers and antennas amounts to several  
>millions of dollars for each station, not to mention cameras, recorders,

>Studio-Transmitter Links, etc.

Scary huh? Upgrading from early 1950's technology to present day standards can be expensive. The NAB should be commended for holding out so long.

>Instead of continuing to broadcast  
>using 6 Mhz channels, perhaps they should use Spread Spectrum spread  
>over the whole UHF band. It seems to me this could result in a reduction  
>in transmitter power of at least 10 db. I am sure there must be some good  
>reasons why this is not a good idea.

Actually, it is quite a good idea, but for a different reason than you suggest. SS itself is no free ride with regards to power levels. The physics still apply. Granted, with FEC techniques you can do better, but they can just (almost) as easily apply to standard narrowband techniques. While the average power over a given portion of the band might go down, the average power over the entire band would stay about the same as the previous narrowband signal.

Where SS would really shine in the broadcast arena would be in frequency reuse of a specific geographic area. Then we could pry some frequencies out of the NAB's warehouse for more useful things.

>  
>What are your thoughts?  
>  
>Roy W7IDM, ex N5RG  
>  
>

Jeff WB8WKA ex Broadcast Engineer WKBD-TV50

---

### 33. Re: [SS:1812] Another FHSS radio question

From: Jeff King <jeff@mich.com>  
Date: Wed, 19 Nov 1997 18:13:24 -0500  
To: ss@tapr.org, mcdermot@aud.alcatel.com  
Message-ID: <3.0.3.32.19971119181324.03748970@mail.mich.com>  
Rendered body type: text/plain

At 11:27 AM 11/19/97 -0600, Tom McDermott wrote:  
>Mark:

>  
>Now, if our software team pulls off a miracle, gets a free stack, etc.,  
well then more options  
>are possible. However, it is most important that the initial software  
release of the radio be  
>as simple as possible, and descopeing features in R1.0 is usually the name  
of the game  
>(especially in the commercial world).  
>  
>Tom McDermott  
>mcdermot@aud.alcatel.com

Tom:

Will the radio be a open standard (i.e. documented I/O and available source code) for those that want to experiment?

-Jeff King wb8wka

Regards,

-----  
| Jeff King        Aero Data Systems |  
| jeff@mich.com   P.O. Box 510895   |  
| (810)471-1787   Livonia, MI 48151   |  
| F(810)471-0279   United States     |  
-----

---

### 34. Re: [SS:1820] Re: Another FHSS radio question

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Wed, 19 Nov 1997 18:01:22 -0600  
To: ss@tapr.org  
Message-ID: <v0311070cb0992e38c300@[208.134.134.40]>  
Rendered body type: text/plain

Hi Jeff.

I tis our goal at this time to make as much of the radi oavailable as we can -- just as in the DSP-93.

Cheers - Greg

```
>At 11:27 AM 11/19/97 -0600, Tom McDermott wrote:
>>Mark:
>
>>
>>Now, if our software team pulls off a miracle, gets a free stack, etc.,
>well then more options
>>are possible. However, it is most important that the initial software
>release of the radio be
>>as simple as possible, and descoping features in R1.0 is usually the name
>of the game
>>(especially in the commercial world).
>>
>>Tom McDermott
>>mcdermot@aud.alcatel.com
>
>
>Tom:
>
>Will the radio be a open standard (i.e. documented I/O and available source
>code) for those that want to experiment?
>
>-Jeff King wb8wka
>
>Regards,
>
>-----
>| Jeff King      Aero Data Systems |
>| jeff@mich.com  P.O. Box 510895   |
>| (810)471-1787  Livonia, MI 48151 |
>|F(810)471-0279  United States     |
>-----
```

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>

---

### 35. Re: [SS:1821] Re: Another FHSS radio question

```
From: Jeff King <jeff@mich.com>
Date: Wed, 19 Nov 1997 21:48:59 -0500
To: ss@tapr.org
Message-ID: <3.0.3.32.19971119214859.0086a640@mail.mich.com>
Rendered body type: text/plain

At 06:30 PM 11/19/97 -0600, you wrote:
>Hi Jeff.
>
>I tis our goal at this time to make as much of the radi oavailable as we
>can -- just as in the DSP-93.
>
>Cheers - Greg
>

Thats cool. Let me know if you need any help with the PIC stuff, as I
understand
you'll have one onboard. I've done alot of PIC programming around here for the
auto companies and OEM's. I also have a emulator.

-Jeff
```

---

### 36. Re: [SS:1811] RE: [1809] Another FHSS radio question

```
From: "Dale Heatherington" <wa4dsy@wa4dsy.radio.org>
Date: Thu, 20 Nov 97 09:40:02
To: "ss@tapr.org" <ss@tapr.org>
Message-ID: <m0xYXm2-0002JKC@wa4mei.radio.org>
Rendered body type: text/plain

On Wed, 19 Nov 1997 10:14:20 -0600 (CST), mdmiller@onramp.net wrote:

>At 12:05 PM 11/18/97 -0600, Tom McDermott
```



> wrote:  
>>Release 1 of the radio is just an IP extension cord. Putting a full  
>TCP/IP stack into the radio is a significant  
>>software effort, plus a stack has to be licensed, paid for, etc. So, it's  
>not likely to be there unless some  
>>miracle happens.

Are you going to convert the ethernet header to ax25 format ? If not, how will the  
radio ID the packets? CW? ;-)

-----  
Dale Heatherington, WA4DSY  
e-mail - daheath@ibm.net  
Web page - <http://www.wa4dsy.radio.org>  
OS/2 Warp 4.0 The worlds finest desktop OS.

---

### 37. Re: [SS:1815] Re: DTV & SS

From: N5RG@aol.com  
Date: Thu, 20 Nov 1997 12:07:13 -0500 (EST)  
To: ss@tapr.org  
Message-ID: <971120120713\_541561942@mrin58.mail.aol.com>  
Rendered body type: text/plain

> > One engineer told me the other day they thought, that to maintain  
> > the same coverage area they currently have, they will have to increase  
> > their transmitter power by 3 times.  
>  
> I'm not seeing why they think they'll need that power increase. If they  
> were to broadcast an analog image, the increase in image size would  
> probably make the increase in power necessary just to keep the data  
> stable, but as far as I am aware, HDTV is a digital standard which uses  
> compression techniques to greatly reduce the data needed for transmission,  
> allowing transmission over a smaller spectrum for the same quantity of  
> data. Am I mistaken as to the HDTV you're referring to?

I am speaking of High Definition TV (HDTV). You are correct in that it  
does use compression to reduce the data rate. According to the article  
"MPEG: the surprise TV standard" in the September 1997 issue of  
IEEE SPECTRUM, MPEG-2 has become the world wide TV compression  
standard and has been adopted by the Grand Alliance as the standard  
for HDTV.

Articles in the Oct 1997 issue of Broadcast Engineering magazine indicate  
that the on the air broadcast will be at a maximum bit rate of 19.39 Mb/s  
using  
an 8 level Vestigial SB signal (8-VSB) broadcast in the standard 6 MHz TV  
channel. Packetized data transport will be used, based upon MPEG-2,  
which will provide for the flexible transmission of virtually any combination  
of video, audio, and data.

There is a "cliff effect", meaning that you either get a perfect picture or  
you  
don't get anything. There is no deep fringe area. The signal has to be  
received well enough that there are no data errors, or else the signal cannot  
be decoded. This is why more power is needed to provide the same  
coverage area as is currently provided by the analog system.

> > I had the thought that perhaps the way the TV industry has chosen to  
> > broadcast  
> > DTV is obsolete before they even start. Instead of continuing to  
> broadcast  
> > using 6 Mhz channels, perhaps they should use Spread Spectrum spread  
> > over the whole UHF band. It seems to me this could result in a  
reduction  
> > in transmitter power of at least 10 db. I am sure there must be some  
good  
> > reasons why this is not a good idea. Perhaps the receivers would be to  
> > expensive, etc.  
>  
> The receivers, being the TV set in your house, will already be fairly  
> expensive, since they will have a special chipset (actually several),  
> used to decode the 7 or so standards embedded within the larger standard.  
> As I've been told, they couldn't make up their minds and just go with  
> a good MPEG version, but instead different studios forced other  
proprietary  
> formats into the standard, meaning each receiver will require about 7  
> chipsets (each proprietary format is on its own chipset) in the receiver.  
> Therefore, the cost for a new television will be several hundreds of

dollars  
> above what it currently is, and a converter receiver box for old TV's, if  
> they'll even release them, will be in the hundreds as well.

This does not seem to be true based upon what I read in the articles in the IEEE Spectrum and BROADCAST engineering. The Grand Alliance has chosen MPEG-2 as the standard for HDTV. At least some of the direct broadcast satellites (DBS) also use MPEG-2. I know DishNet does.

---

### 38. Re: [SS:1823] RE: [1809] Another FHSS radio question

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Thu, 20 Nov 1997 13:08:42 -0600  
To: ss@tapr.org  
Message-ID: <v03110702b09a332ef99f@[208.134.134.40]>  
Rendered body type: text/plain

One of the things we have been discussing is why use AX.25 anymore in the software design. While CW is a satirical comment, there are better ways of doing this I think then using AX.25.  
There is no need to convert the header to AX.25.

Cheers - Greg

>On Wed, 19 Nov 1997 10:14:20 -0600 (CST), mdmiller@onramp.net wrote:  
>  
>>At 12:05 PM 11/18/97 -0600, Tom McDermott  
>> wrote:  
>>>Release 1 of the radio is just an IP extension cord. Putting a full  
>>TCP/IP stack into the radio is a significant  
>>>software effort, plus a stack has to be licensed, paid for, etc. So, it's  
>>not likely to be there unless some  
>>>miracle happens.  
>  
>Are you going to convert the ethernet header to ax25 format ? If not, how  
>will the  
>radio ID the packets? CW? ;-)  
>  
>  
>-----  
>Dale Heatherington, WA4DSY  
>e-mail - daheath@ibm.net  
>Web page - <http://www.wa4dsy.radio.org>  
> OS/2 Warp 4.0 The worlds finest desktop OS.

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>

---

### 39. RE: 1825] RE: [1809] Another FHSS radio question

From: Guy Story <GStory@icomply.com>  
Date: Thu, 20 Nov 1997 15:19:04 -0600  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <c=US%a=\_%p=LEW%l=LEW\_PRODS1-971120211904Z-1371@lew\_prods1.icomply.com>  
Rendered body type: text/plain

What kind of format has been discussed Greg?  
Guy Story  
International Compliance Corporation  
802 N. Kealy  
Lewisville, TX 75057-3136  
voice: 972.436.9600  
fax: 972.436.2667  
email: gstory@icomply.com  
webpage: <http://www.icomply.com>  
"These are my views not necessarily my employer's views."

>-----  
>From: Greg Jones, WD5IVD[SMTP:wd5ivd@tapr.org]  
>Sent: Thursday, November 20, 1997 1:21 PM  
>To: ss@tapr.org  
>Subject: [SS:1825] RE: [1809] Another FHSS radio question  
>  
>One of the things we have been discussing is why use AX.25 anymore in the  
>software design. While CW is a satirical comment, there are better ways of

```

>doing this I think then using AX.25.
>There is no need to convert the header to AX.25.
>
>Cheers - Greg
>
>>On Wed, 19 Nov 1997 10:14:20 -0600 (CST), mdmiller@onramp.net wrote:
>>
>>>At 12:05 PM 11/18/97 -0600, Tom McDermott
>>> wrote:
>>>>Release 1 of the radio is just an IP extension cord. Putting a full
>>>>TCP/IP stack into the radio is a significant
>>>>software effort, plus a stack has to be licensed, paid for, etc. So, it's
>>>>not likely to be there unless some
>>>>miracle happens.
>>
>>Are you going to convert the ethernet header to ax25 format ? If not, how
>>will the
>>radio ID the packets? CW? ;-)
>>
>>
>>-----
>>Dale Heatherington, WA4DSY
>>e-mail - daheath@ibm.net
>>Web page - http://www.wa4dsy.radio.org
>> OS/2 Warp 4.0 The worlds finest desktop OS.
>
>
>-----
>Greg Jones, WD5IVD
>Austin, Texas
>wd5ivd@tapr.org
>http://www.tapr.org/~wd5ivd
>
>
>

```

---

#### 40. Re: [SS:1824] Re: DTV & SS

```

From: bm@lynx.ve3jf.ampr.org
Date: Fri, 21 Nov 1997 04:20:30 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199711210420.EAA26902@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

```

N5RG@aol.com wrote:

```

>
> There is a "cliff effect", meaning that you either get a perfect picture or
> you
> don't get anything. There is no deep fringe area. The signal has to be
> received well enough that there are no data errors, or else the signal cannot
> be decoded. This is why more power is needed to provide the same
> coverage area as is currently provided by the analog system.

```

Only if you have a very warped definition of "coverage". It's true that, like any digital system, the DTV system will have a sharp threshold in terms of quality vs C/N... but it doesn't follow that more power is needed than for an analog system. The 8VSB DTV system needs a C/N of about 15 dB to deliver an unimpaired service. At 15 dB C/N, the analog NTSC system would be virtually unusable.

See [http://nebo.cs.byu.edu/~scoville/luigi/ga\\_transtest.html](http://nebo.cs.byu.edu/~scoville/luigi/ga_transtest.html) for details about the field trials, which concluded, among other things:

"The ATV system was shown to perform better than NTSC at all distances from the transmitter."

and

"It is especially noteworthy that the VSB signal showed significant remaining operating margin above the BER threshold at many locations where NTSC reception was unsatisfactory."

The transmitter power used for the digital system during these tests was actually 12 dB lower than for the NTSC system.

Barry

```

--
Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
Packet Working Group | Web: http://hydra.carleton.ca

```

---

#### 41. Re: [SS:1816] Re: DTV & SS

From: N5RG@aol.com  
Date: Thu, 20 Nov 1997 23:53:36 -0500 (EST)  
To: ss@tapr.org  
Message-ID: <971120235335\_-803730253@mrin47>  
Rendered body type: text/plain

> Jeff Morton wrote:  
>  
> > > One engineer told me the other day they thought, that to maintain  
> > > the same coverage area they currently have, they will have to increase  
> > > their transmitter power by 3 times. If all five of the high power TV  
> > > transmitters  
> > > at this site increase their power by three times, there will not be  
> nearly  
> > > enough primary power coming through the Idaho Power lines feeding the  
> > > site to supply the power needed. Idaho Power estimates it will cost  
> one  
> > > million dollars to install the additional power lines needed to supply  
  
> the  
> > > increased load.  
> >  
> > I'm not seeing why they think they'll need that power increase. If they  
> > were to broadcast an analog image, the increase in image size would  
> > probably make the increase in power necessary just to keep the data  
> > stable, but as far as I am aware, HDTV is a digital standard which uses  
> > compression techniques to greatly reduce the data needed for  
transmission,  
> > allowing transmission over a smaller spectrum for the same quantity of  
> > data. Am I mistaken as to the HDTV you're referring to?  
>  
> The need for increased transmitter power to cover the same geographical  
area  
> is  
> probably related to the fact that most of the DTV permits granted by the  
FCC  
> are  
> in the UHF band and not the VHF band. To cover the same area in UHF that  
> you  
> covered in VHF requires more power and/or higher towers.  
>  
> Stations that were already in UHF don't need to make big power or tower  
> changes  
> with the move to DTV, but stations that were down in the VHF range ( 2 -  
13 )  
> ,  
> will need to make changes.  
>  
> -John Scott, KD4VHG  
> Currently working at WAGA-TV in Atlanta.  
>

I think you are correct. The reason for an increase in power is the move  
to UHF. All five of the stations are currently in the VHF band and will  
be moving to UHF.

Roy W7IDM, ex N5RG

---

#### 42. Re: [SS:1819] Re: DTV & SS

From: N5RG@aol.com  
Date: Thu, 20 Nov 1997 23:53:42 -0500 (EST)  
To: ss@tapr.org  
Message-ID: <971120235341\_1305557178@mrin38>  
Rendered body type: text/plain

> >Instead of continuing to broadcast  
> >using 6 Mhz channels, perhaps they should use Spread Spectrum spread  
> >over the whole UHF band. It seems to me this could result in a reduction  
> >in transmitter power of at least 10 db. I am sure there must be some  
good  
> >reasons why this is not a good idea.  
>  
> Actually, it is quite a good idea, but for a different reason then you  
> suggest. SS itself is no free ride with regards to power levels. The  
> physics still apply. Granted, with FEC techniques you can do better,  
> but they can just (almost) as easily apply to standard narrowband  
> techniques. While the average power over a given portion of the band

> might go down, the average power over the entire band would stay about  
> the same as the previous narrowband signal.

SS is still mysterious to me. I hear about processing gains of 10 to 20 db.  
I thought that if the signal were spread enough to achieve a processing gain  
of 10 db then the transmitter power could be reduced by 10 db.

What is that equation for processing gain?

Roy W7IDM, ex N5RG

---

#### 43. Re: [SS:1826] Identification packets

From: LNUSSAT.JMALMBER@eds.com  
Date: Fri, 21 Nov 1997 11:49:44 -0500  
To: ss <ss@tapr.org>  
Message-ID: <0095000006414152000002L022\*@MHS>  
Rendered body type: text/plain

If it is not yet set in stone, I would recomend basing the ID on the  
RFC1001/1002 nameserver specification.  
It is implemented native on OS/2, LINUX and the various MS- networking packages.

For operating systems not in that list, "see  
<http://samba.canberra.edu.au/pub/samba/>".

An application on the host system (not the radio) could send out the ID packets.

There may be other IP based methods that could be used for Identification.

Regards, John Malmberg  
WB8TYW @K4HRY.#MIDTN.TN.USA

E-Mail: lnussat.jmalMBER@gmeds.com

---

#### 44. Re: [SS:1806] RE: 1804] Another FHSS radio question

From: LNUSSAT.JMALMBER@eds.com  
Date: Fri, 21 Nov 1997 19:12:43 -0500  
To: ss <ss@tapr.org>  
Message-ID: <0095000006436382000002L022\*@MHS>  
Rendered body type: text/plain

Tom wrote:

>In the initial release, the radio will just be an IP-extension pipe. ...

This is fine for any host system, once the link is established.  
The issue is how to control the radio from the host and establish the link.

There has to be some way to select the channel to be used, and that does not  
map into any of the TCP/IP functions that I know of.

One method some of the TCP/IP devices that I work with is to have them answer  
to a TELNET connection for doing this maintenance.

Any access to the radio using the MAC address for Control and Status will  
need a special driver written on the host.

It appears that in some areas, a linked configuration could work better than a  
hub. This seems to require the about the same amount of transceivers, two per  
station, but allow the operation to be completely transparent to web browsers  
and other connectionless services, or multiple simultaneous connections.

I am of course assuming that the hams that invested in this technology would  
not want to get a busy signal. I know that I would not be.

Because the links would just be IP or Ethernet extension cords of the previous  
link, special programming would not be needed.

I realize that it is spectrally less efficient than a hub, as packets would  
be sent to all stations, not just where they were needed.

The links could be converted to a collection of linked hubs when the number  
of stations in the area merried it.

For a hub configuration, I would probably want all the routing intelligence  
to be in an external host system, not the radios. Off the shelf equipment

is readily available for this.

I am assuming that the 20 mile range is with a directional antenna. A set of links can cover a larger area than a hub in this case.

Regards, John Malmberg  
WB8TYW @K4HRY.#MIDTN.TN.USA

E-Mail: lnussat.jmalmer@gmeds.com

---

#### 45. RE: 1831] RE: 1804] Another FHSS radio question

From: Tom McDermott <mcdermot@aud.alcatel.com>  
Date: Sat, 22 Nov 1997 19:43:20 -0600  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <01BCF77E.E39712C0.mcdermot@aud.alcatel.com>  
Rendered body type: text/plain

Generally, the radio can perform as an Ethernet Bridge. Or, even better as a filtering, self-learning, or intelligent bridge. In this case, packets are not forwarded unless in fact they should traverse the link. The bridge 'learns' which addresses are on which end of the link, and builds a simple yes/no forwarding table. This is pretty old technology in the Ethernet world, but we have to write the whole thing from scratch for the radio. The bridge function must be sure to handle broadcast packets properly (such as ARP packets).

I envision this as the initial configuration because it requires no LAN administration (precisely the reason our I.S. guys at work like it).

You are correct about the radio having to establish the initial link, and we will be working on either a

telnet or MAC-level package to do that. The software guys have been trying to find MAC-level drivers (I think they are called NDIS) with not much luck. MAC-level would be the most elegant.

Tom McDermott  
mcdermot@aud.alcatel.com

-----Original Message-----

From: LNUSSAT.JMALMBER@eds.com [SMTP:LNUSSAT.JMALMBER@eds.com]  
Sent: Friday, November 21, 1997 6:20 PM  
To: ss@tapr.org  
Subject: [SS:1831] RE: 1804] Another FHSS radio question

Tom wrote:

>In the initial release, the radio will just be an IP-extension pipe. ...

This is fine for any host system, once the link is established.  
The issue is how to control the radio from the host and establish the link.

There has to be some way to select the channel to be used, and that does not map into any of the TCP/IP functions that I know of.

One method some of the TCP/IP devices that I work with is to have them answer to a TELNET connection for doing this maintenance.

Any access to the radio using the MAC address for Control and Status will need a special driver written on the host.

It appears that in some areas, a linked configuration could work better than a hub. This seems to require the about the same amount of transceivers, two per station, but allow the operation to be completely transparent to web browsers and other connectionless services, or multiple simultaneous connections.

I am of course assuming that the hams that invested in this technology would not want to get a busy signal. I know that I would not be.

Because the links would just be IP or Ethernet extension cords of the previous link, special programming would not be needed.

I realize that it is spectrally less efficient than a hub, as packets would be sent to all stations, not just where they were needed.

The links could be converted to a collection of linked hubs when the number of stations in the area merited it.

For a hub configuration, I would probably want all the routing intelligence to be in an external host system, not the radios. Off the shelf equipment is readily available for this.

I am assuming that the 20 mile range is with a directional antenna. A set of links can cover a larger area than a hub in this case.

Regards, John Malmberg  
WB8TYW @K4HRY.#MIDTN.TN.USA

E-Mail: lnussat.jmalmber@gmeds.com

---

#### 46. SIGNOFF SS mhs!merlin/ou=blu0005@attmail.com

From: /OU1=BLU0005@mhs-merlin.attmail.com  
Date: Sun, 23 Nov 1997 12:13:30 -0500  
To: ss@tapr.org  
Message-ID: <BLU0005/97-11-23/12:13:29>  
Rendered body type: text/plain  
(INTERNET:tapr.org<b>ss)

FROM: mhs!merlin/ou=blu0005@attmail.com

SUBJECT: SIGNOFF SS

Thank you for the information but at this time I would like to withdraw from the mailing list.

Maintainer of the SIG is Barry McLarnon, VE3JF. Please direct comments and suggestions to bm@hydra.carleton.ca or ve3jf@tapr.org.

-----  
---  
Tucson Amateur Packet Radio  
  
8987-309 E Tanque Verde Rd #337 \* Tucson, Az \* 85749-9399 \* 817-383-0000  
\*\*\*\*\*  
\*\*\*\*\*

To unsubscribe from this mailing list send a message to 'listserv@tapr.org' with the following line in the body of the message:

signoff ss

---

#### 47. "Re: Mars site to add to XMAS list"

From: "Lisa B." <lisabnkrft@worldnet.att.net>  
Date: 28 Nov 1997 17:39:03 -0000  
Cc: recipient list not shown: ;  
Message-ID: <19971128173903.2548.qmail@sdn-ts-001pakpru05.dialsprint.net>  
Rendered body type: text/plain

Please forward to friends and bookmark for Christmas shopping...

<http://www.martianconsulate.com>

Use my code "18310SST" for online discounts when ordering.

- Lisa

>> On Wednesday, November 26, 1997, lisabnkrft@worldnet.att.net wrote:  
>>  
>> Joan,  
>>  
>> ... here's that site doing the Mars "Land Claims":  
>>  
>> <http://www.martianconsulate.com>  
>>

>> I bought one for Bill's birthday last month. He was thrilled it  
> Thanks! Cool site -- I sent it around the office :) Never too  
> many Martians around -- keeps the UFO abduction rate to a mininum!!!  
> See you on Tuesday at the bookstore. Tell Mary that she needs

To remove your name from our mailing list, please send a message  
with no lines with the subject 'REMOVE' to the address above.

---

#### 48. MC68EN360

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Sun, 30 Nov 1997 18:03:15 -0600  
To: " Spread Spectrum " <ss@tapr.org>  
Message-ID: <v0311071eb0a7ae0ac657@[208.134.134.40]>  
Rendered body type: text/plain

Several asked about the processor that is used on TAPR 900 Mhz FHSS radio during the FHSS project discussion on Sunday at the DCC. Darryl Smith asked about making mods to the current project for some other applications. I pointed out that there was already a board available that does what he wants, since the goal of the current project was not to generate a generic processor which was already available. I said I would send the ref along as soon as I was able to get it from Bill.

Bill Reed, WD0ETZ, who uncovered it sent this along today:

Atlas Computer Equipment, Inc  
3700 State Street  
Santa Barbara, CA 93105

805-898-2450

Model: ACE360/QM  
Price in qty 1: \$450.00 Plus shipping  
Features: MC68EN360, 10 Base T port, serial port, serial EEPROM, flash, dram.

I did find a link to them: <http://interop.sbforums.com/ltbdir/company/200194/>

Cheers - Greg

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>

---

#### 49. SS in JA

From: Katsuhiko MOROSAWA <jh0mrp@dl.hlb.casio.co.jp>  
Date: Mon, 1 Dec 1997 10:57:06 +0900 (JST)  
To: ss@tapr.org  
Message-ID: <348219721F4.0C42.jh0mrp@dl.hlb.casio.co.jp>  
Rendered body type: text/plain

Some Japanese amateur radio stations were licensed Spread Spectrum, by MPT (Ministry of Posts and Telecommunications), recently. Most stations, however, can't QSO each other, since



they use different SS method.

Mr. Mano (JJ1CEI) and I (7K1NCP), on the other hand, applied for SS license, using compleatly same system, which was developed by Mr. Mano, and recieved licenses late in October.

The first SS QSO in Japan was performed on November 2. I've reported it on my webpage. Please take a look at following location.

<http://www2s.biglobe.ne.jp/~jh0mrp/ss/1stQSO.html>

In addition, we are planning some outdoor experiments. I'll inform you of the results of these comming experiments too.

--

Katsuhiko "Kay" MOROSAWA (JHMRP, 7K1NCP)

---

# December 1997

Original source file: ss.9712

Source: [http://ftp.tapr.org/tapr\\_history/SIG\\_Archives/spread-spectrum-sig/mail\\_archive/ss.9712](http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9712)

## 1. Re: [SS:1834] "Re: Mars site to add to XMAS list"

From: atlas@quiknet.com  
Date: Mon, 01 Dec 1997 18:03:43 -0800  
To: ss@tapr.org  
Message-ID: <34836C7F.5DB3@quiknet.com>  
Rendered body type: text/plain

Lisa B. wrote:  
>  
> Please forward to friends and bookmark for Christmas shopping...  
>  
> <http://www.martianconsulate.com>  
>  
> Use my code "18310SST" for online discounts when ordering.  
>  
> - Lisa  
>  
>> On Wednesday, November 26, 1997, lisabnkrft@worldnet.att.net wrote:  
>>  
>> Joan,  
>>  
>> ... here's that site doing the Mars "Land Claims":  
>>  
>> <http://www.martianconsulate.com>  
>>  
>> I bought one for Bill's birthday last month. He was thrilled it  
>  
>> Thanks! Cool site -- I sent it around the office :) Never too  
>> many Martians around -- keeps the UFO abduction rate to a mininum!!!  
>> See you on Tuesday at the bookstore. Tell Mary that she needs  
>  
> To remove your name from our mailing list, please send a message  
> with no lines with the subject 'REMOVE' to the address above.

This list is not for spam!!!

Its members have a tendency to flame.

---

## 2. Re: [SS:1837] Re: "Re: Mars site to add to XMAS list"

From: Gerry Creager <n5jxs@tamu.edu>  
Date: Mon, 01 Dec 1997 11:31:07 -0600  
To: ss@tapr.org  
Message-ID: <3482F45B.4AC9@tamu.edu>  
Rendered body type: text/plain

atlas@quiknet.com wrote:  
>  
> Lisa B. wrote:  
>>  
>> ...  
>> Please forward to friends and bookmark for Christmas shopping...  
>>  
>> <http://www.martianconsulate.com>  
>>  
>> Use my code "18310SST" for online discounts when ordering.  
>>  
>> - Lisa  
>>  
>>  
>>  
>> This list is not for spam!!!  
>>  
>> Its members have a tendency to flame.

I sent a note to ATT.net and got a reasonable response saying appropriate action had been taken. They said to forward any such problems in the future to them (postmaster@att.net) and their Abuse Team would take a particular interest in it.

Regards,  
Gerry  
n5jxs@tamu.edu

### 3. A few comments about recent SPAM on the list

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Tue, 2 Dec 1997 05:37:06 -0600  
To: " Spread Spectrum "<ss@tapr.org>  
Message-ID: <v03130318b0a9a33622ee@[208.134.134.40]>  
Rendered body type: text/plain

I wanted to share parts of a page maintained by Lsoft about SPAM. Please read it over and think about our lists when you do this. Visit <http://www.lsoft.com/spamorama.html> for the full text.

Cheers - Greg, WD5IVD

-----

The One Way to stop spamming forever...

...is to render it ineffective by never responding to it!

How to respond to a spam

If a spam gets through to your list, it will probably engender sarcastic replies (often with the spam quoted in its entirety) - and these replies will often be posted back to the list. It is therefore imperative that you make subscribers aware that when a spam occurs:

- \* The person responsible for the spam is probably not subscribed to the list, and thus any response back to the list will fail to reach the offender.
- \* An appropriate response to a spam is to forward a single copy of the spam to the person in charge of the site from which the spam originated ("POSTMASTER", "root", etc.), pointing out that the spammer is probably violating his site's appropriate use policies.
- \* It is inappropriate to attempt to flood the spammer's mailbox with network mail in response. This is probably in violation of your network's appropriate use policies, and it just wastes bandwidth.

Perhaps the best policy an individual subscriber can adopt toward spammers is to simply to **\*\*ignore them\*\***, leaving the problem in the hands of list owners and newsgroup moderators, who usually have more Internet experience. If this does not work and subscribers send their complaints to the list anyway, it might be a good idea to moderate the list for a few days until the furor dies down.

Finally, we would like to propose the following guidelines for reacting to unwanted solicitation on or off your lists:

1. DO NOT FLAME ON THE LIST! The spammer is probably not subscribed, so you would just be adding to the noise level.
2. Remember the name of the company that sent you the ad, and make sure never to buy anything from them. Call their corporate headquarters and let them know how much you were upset by the spam. In many cases, the companies whose products are featured in the spam acted out of ignorance and genuinely did not know that this form of advertisement was not appreciated. Educating them will make the spam company lose a customer.
3. Do not bother flaming the spammer. By the time you read the spam, his account will already have been closed, assuming it isn't a bogus account to start with. At any rate, the spammer will not bother reading people's indignant replies. Spammers are usually well aware of what they are doing, and are totally indifferent to your feelings. Replying is just a waste of your time.
4. Do not flame the service provider. It is easy to say "You shouldn't be allowing people like XXXX to get an account!", but it is impossible to implement in practice. Just as L-Soft cannot do much to monitor and control how individuals use our software once they license it, it is equally difficult for an Internet service provider to control what customers do with their accounts.

Even if someone developed a psychological test that enabled service providers to detect would-be spammers in advance with 99.9% certainty, it would be a legal nightmare to put the test in operation. And it

would be completely useless. All you need to spam millions of people is a free 10-day trial diskette from any major online provider. All in all, it's absolutely impossible to run a free interchange medium like the Internet without getting a number of unwanted people in the lot. There are unscrupulous people on the Internet, just as there are in the rest of the world, and there isn't much anyone can do about it, because until they speak up they're just an e-mail address like any other. The same goes with spammers.

5. Do not press the service provider for assistance in "tracing" the spammer. In most countries it would be unlawful for them to release this kind of information to you. However, the spammer probably provided a snail-mail address or phone number in his message, or some other contact point to place orders. If you really want to find out more about him, this is a good starting point, and it places you squarely in the realm of real world law, which is well understood by the judges and lawyers.
6. If you want to inconvenience the spammer in retaliation for the inconvenience you have suffered, by all means do go ahead, but NOT OVER THE INTERNET! Mail-bombing the provider's Postmaster address will inconvenience the provider, not the spammer, and in most cases the provider is a victim, just like you. It's going to cost them thousands of dollars in wasted manpower just to discard all the flamage they will receive. Instead, what you should do is use the real world contact info that was provided with the advertisement. This will actually reach the spammer, because this is where he is hoping to receive the checks. Yes, it means you will have to use a real world communication medium, but that's your only option. The hard reality is that complaining over the Internet will accomplish nothing: after sending the ad, the spammer is gone from the Internet. Orders will be placed using real world methods and that is your only means of reaching the spammer from then on.
7. When accusing people or companies in public, make sure to check your facts carefully before pressing the SEND button. Remember how spamming works: the spammer abuses the computer resources and manpower of hundreds of thousands of sites worldwide to deliver his advertisement. The victims are you, us, and just about everyone on the Internet. Yes, even people whose name or hostname is mentioned in the mail header are likely to be victims; spammers have no qualms about forging mail, and even when they don't, it still doesn't mean the parties involved had knowledge of the spammer's activities and will share the profits.

So, if you have to make an assumption, it should be that the people involved in the delivery of the message are victims, just like you, except that the spam will waste even more time for them than for you. The last thing you need, when you have just spent four hours answering spam complaints from (other) victims, is to see a message where someone accuses you and/or your employer of being the master mind of organized spamming and suggests that you should be shot for the public good, or at least that someone should send the FBI to your house and have you put under arrest, with dozens of messages agreeing with the previous one or suggesting even more barbaric forms of punishment.

In fact, such messages are taken seriously by some of the people they target and may result in serious psychological trauma. They may also result in a lawyer or police officer giving you a phone call, when you did not really mean what you were typing. So far spamming has yet to result in human death; please, let's keep it this way.

----

Segments taken from <http://www.lsoft.com/spamorama.html>

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Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>

---

#### 4. Philips Semiconductors Delivers Complete Vestigial Side Band Solution For Digital TV (And other things...)

From: Mike Cheponis <mac@Wireless.Com>  
Date: Wed, 3 Dec 1997 14:03:47 -0800 (PST)  
To: ss@tapr.org  
Message-ID: <Pine.BSI.3.95.971203135509.22294s-100000@ns1.culver.net>  
Rendered body type: text/plain

I thought this might be of interest to people on this list. It doesn't take much imagination to think of ways to use these kinds of components...

-Mike K3MC

---

(PHILIPS-SEMICONDUCTORS) Philips Semiconductors Delivers Complete Vestigial Side Band Solution For Digital TV  
(Business Wire; 12/03/97)

Business Editors/Computer Writers

SUNNYVALE, Calif.--(BUSINESS WIRE)--Dec. 3, 1997--

VSB Tuner Front End and Channel Decoder Chipset Provides Complete Solution For Emerging DTV Standards in the US and Abroad

Continuing its tradition of leadership in the television systems market, Philips Semiconductors today announced a complete chipset design for handling Vestigial Side Band (VSB) signals for Digital TV. Initially being targeted at the American market because of its full compliance with the recently announced ATSC (Advanced Television Systems Committee) formats for Digital TV, the new chipset consists of the Philips TDA9829T or TDA9819 VSB IF downconverters, and the TDA8960 VSB integrated demodulator and decoder.

The Philips VSB chipset is capable of processing terrestrial or cable DTV signals and converting them to the stage of a digital MPEG transport stream that can then be used in a personal computer, television or hybrid set top box device. In addition to its compliance with the emerging American standards for DTV, the Philips VSB solution will be available for other parts of the world as relevant standards are determined using the experience gained from pioneering the US marketplace.

"Our design provides a complete system solution to handle the initial part of VSB Digital TV signals," explained Guenther Dengel, Philips Semiconductors' managing director for the Philips Consumer IC group.

"This is generating a lot of interest, particularly from major computer manufacturers who are keen to integrate DTV into PCs. Naturally, we can also provide ICs to handle the MPEG stream thereafter for whatever application they may be working on. For PC applications, the MPEG transport stream can be fed into a graphics controller, TriMedia(tm) processor or PCI bus master IC."

About the Philips TDA9819 and TDA9829T Downconverters

The Philips TDA9819 and TDA9829T downconverters work on IF frequencies from 38.9 MHz to 45.75 MHz, to handle the terrestrial applications of the standard 6 MHz VHF/UHF terrestrial TV channels (TV channels 2 to 69 in the US) and similarly, for cable applications, the standard 6 MHz VHF/UHF cable TV channels. They provide true synchronous demodulation with active carrier regeneration, very linear demodulation, good intermodulation figures, reduced harmonics and excellent pulse response.

Both downconverters are based on a design consisting of three AC-coupled, differentiator amplifier stages, with each differential stage comprising a feedback network controlled by emitter degeneration to control the IF gain. The TDA9819 provides the additional feature of being able to accept both digital video and analog TV input.

The TDA9819 is available now in a 32 pin SDIP package and is priced at approximately \$2.82 in quantities of 10,000, while the TDA9829T will be available in early 1998 in a 20 pin SO package, priced at approximately \$2.05 in similar volumes.

About the TDA8960 Integrated Demodulator and Decoder

The Philips TDA8960 is an 8-VSB demodulator and decoder that handles the channel decoding prior to the signals going to the source decoder for MPEG decoding.

It functions as a one chip ATSC-compliant demodulator and concatenated trellis (Viterbi)/Reed-Solomon decoder with de-interleaver and descrambler. Adaptive equalization is performed based on the use of the ATSC field sync (trained equalization) and/or the 8-VSB data itself (blind equalization). It is also one of the first such devices to have a Forward Error Corrector (FEC) integrated onto the IC and to generate the Nyquist slope digitally rather than via the Surface Acoustic Wave (SAW) filter.

The IC requires a single "low IF" passband signal centered at half the 8-

VSF symbol rate of 5.38 MHz as an input and provides 8-bit wide MPEG2 transport packet data at the output. It requires a single clock frequency, which is equal to twice the 8-VSB symbol rate. Most of the loop components needed to recover the data from the received symbols are internal.

The only required external loop components are a low-speed DAC (Digital to Analog Converter) and VCXO (Voltage Controlled Crystal Oscillator) for the symbol timing recovery and an op amp integrator for the AGC (Automatic Gain Control). Loop parameters of the clock and carrier recovery can be controlled by I2C. The TDA8960 will be available in a 64 pin QFP in early 1998 and is priced at approximately \$18 in quantities of 100,000 units.

Philips Semiconductors, Inc., a subsidiary of Philips Electronics North America and an affiliate of Philips Electronics NV, headquartered in Eindhoven, The Netherlands, is the ninth largest semiconductor supplier in the world. Philips Semiconductors' innovations in digital audio, video and mobile technology position the company as a leader in the consumer, multimedia and wireless communications markets. Sales offices are located in all major markets around the world and are supported by regional customer applications labs. Additional information on Philips Semiconductors can be found on the home page at [www.semiconductors.philips.com](http://www.semiconductors.philips.com) or by calling 1-800-447-1500 ext. 1486.

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## 5. TAPR SS STA Status

From: Dewayne Hendricks <[dewayne@warpspeed.com](mailto:dewayne@warpspeed.com)>  
Date: Thu, 4 Dec 1997 14:25:36 -0800  
To: [ss@tapr.org](mailto:ss@tapr.org), [ss-sta@tapr.org](mailto:ss-sta@tapr.org)  
Message-ID: <[v04002e0bb0acdd23117f@\[192.168.1.2\]](mailto:v04002e0bb0acdd23117f@[192.168.1.2])>  
Rendered body type: text/plain

The TAPR SS STA was renewed today by the FCC for another six months. As some of you may be aware, there have been a LOT of changes at the FCC of late and although we submitted our request for renewal before the deadline, it has taken this long for them to final issue the grant. There was no lapse in the STA however, as once you have an application on-file, then the current authorization remains in effect until the Commission takes explicit action on the request.

-- Dewayne  
Chair  
TAPR Regulatory Affairs Committee

--

~~~~~  
Dewayne Hendricks, WA8DZP ! Internet: dewayne@warpspeed.com
Warp Speed Imagineering ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
43730 Vista Del Mar ! WWW: <<http://www.warpspeed.com/>>
Fremont, CA 94539-3204 !
Fax: (510) 770-9854 !
~~~~~

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## 6. WAVERIDER READIES LAST MILE SOLUTION LAUNCH

From: Dewayne Hendricks <[dewayne@warpspeed.com](mailto:dewayne@warpspeed.com)>  
Date: Thu, 4 Dec 1997 17:07:12 -0800  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <[v04002e13b0ad0282da70@\[192.168.1.2\]](mailto:v04002e13b0ad0282da70@[192.168.1.2])>  
Rendered body type: text/plain

Note: I am posting this to the SS list because I thought that it would be of general interest. This product offering, if indeed it can do all that they say, at the price point they claim, makes it a cut above the rest of the Part 15 products now on the market.

BTW, their website is <<http://www.waverider.ca/>>. Check it out!

-- Dewayne

WAVERIDER READIES LAST MILE SOLUTION LAUNCH

by Geoff Livingston

Canadian-based WaveRider is readying a 1998 wide-scale deployment of its Last Mile Solution, a wireless solution for Internet service providers (ISPs) who want to feed broadband hungry subscribers more bandwidth. With adjustable speeds ranging between 40.9 and 512 Kbps, ISPs can offer as many as 3,072 subscribers an affordable solution to wireline services. The WaveRider High Speed End User Modem is no larger than contemporary external modems and has a suggested cost of \$249. In addition, the modem never turns off, instead it enters an idle period when not in use. Reactivating takes 0.5 seconds. Users are guaranteed security thanks to the incorporation of frequency hopping,

protocol authentication and a transport layer into the Last Mile Solution.

"Using wireless for the last mile is clearly the most effective way to deliver expanded bandwidth without costly fixed plant upgrades," said Scott Goldman, CEO of The Goldman Group. "The cost for a head-end unit (\$60K) will preclude small ISPs from providing it, although they could resell on systems that do offer it."

"We developed the WaveRider solution because we needed to provide a local school district with high speed connectivity," said Stephen Grant, research and development CEO of WaveRider. "The other solutions available were not cost effective for the amount of speed needed. By creating a wireless solution, we also created a cost-effective system that offered high-speed access."

#### WaveRider Employs Unlicensed Spectrum

WaveRider will be implementing an alpha test in Salmon Arm, British Columbia with 100 modems. The alpha test is scheduled for the first quarter of 1998. Wide-scale deployment will occur as soon as WaveRider is satisfied with the quality and performance of the system -- presumably the first half of 1998.

The system uses unlicensed bands, using the bulk of the spectrum available in the Industry, Science and Medical bands (902-928 MHz). Broadcasting combines digital signal processing (DSP) and a TDMA-based approach. The combination of DSP and complex Frequency Hopping Spread Spectrum gives inherent security to the system and protects users against the possibility of interference.

"Using frequency hopping techniques is a smart idea -- but will seem even smarter as we go through time and those unlicensed bands become increasingly congested," Goldman said. The company should probably be making contingency plans for use of other dedicated frequencies, or maybe doing a joint venture with someone like Winstar or an LMDS licensee to get dedicated frequencies."

To create the Last Mile Solution(tm), ISPs and/or carriers need only to set up the Network Access Point (NAP) server to establish a covering range of 4.26 miles. Using WaveRider Data Relays and Data Repeaters, operators can expand the wide-area wireless network with additional footprints up to 10.96 miles. ISPs have the ability to offer incremental services. For example, users may purchase 40.9 Kbps for \$20 a month, 80 Kbps for \$30, etc. ISPs can offer wireless ethernet or direct packet data connectivity.

"The head-end investment for an ISP costs about \$60,000," Grant said. "That includes antennas and on-site surveys by WaveRider. It's a market ready application, but distributors must be able to support themselves. We feel experience in the wireless industry is a must."

#### WaveRider Readies Corporate Positioning

Inside Wireless Internet ventured to Canada and tested WaveRider's product. While CNN's site came up slow, other graphic laden sites came in at stunning speeds. "The Internet is only as good as its weakest link," said Grant.

With a legitimate product and manufacturing capability set for widespread deployment, WaveRider is ready to take its Last Mile Solution to market in the first quarter of 1998. WaveRider has already landed two contracts, one for a system in the Arctic and a second \$33.6 million Eastern European distribution deal. The European contract with Elkatel ZAO of Moscow covers an initial term of 24 months for the exclusive distribution rights in the region formerly known as the Soviet Union, Poland, the Czech Republic, Slovakia, Bulgaria and Romania. "Our distribution providers must perform to keep their exclusivity," said Bob Clarke, president of WaveRider.

In addition, the company has already been gauging Canadian ISP interest. "We have done some advanced marketing," Clarke said. "When we debuted the product at a trade show in Montreal, the ISPs came through the roof. Now that we are out of the development mode, we will ship in the first year to all of North America. Coming out of the shoot, ISPs are still our targeted customers. There's more than enough business there. But long term, we might expand."

To help the company in its efforts, Bruce Sinclair, former President of Dell Computer Canada and former CEO of Dell Europe was brought on board as CEO. Sinclair joined WaveRider on Nov. 18, and is participating in preparing the Last Mile Solution launch. Sinclair, who in a two-and-a-half year time frame brought computer giant Dell Europe from a \$250 million per year company to one that boasted revenues in the first quarter of 1994 of \$500 million, intends to take WaveRider to the heights of his previous successes.

"My expertise is in managing the two greatest challenges many young high technology companies face: rapid growth and developing world-wide marketing

opportunities," Sinclair said. "Based on the technology this company has developed, managing these challenges can enable WaveRider to become a leading provider of wireless data communications products world-wide."

#### A Case of Entrepreneurial Spirit

Perhaps the most interesting aspect of WaveRider's technology is the story behind the technology. Abraham Lincoln said that one of the great inventions of man has been patent law, which gives people the incentive to use "The Fire of Invention." WaveRider Research and Development CEO Stephen Grant is a clear example of that.

Grant came up with the idea for the Last Mile Solution when he was implementing the original wireless solution for a school district. Grant purchased \$12,000 worth of equipment from a company he will not name. When he opened up the equipment, he was disappointed.

"There was certainly room for improvement," said Grant. "The actual parts in the equipment could be purchased for a much cheaper price, and the architecture and workmanship could have been done in better ways. I said to myself, 'I can do this better.'"

And thus, the Last Mile Solution was born. In the spirit of Lincoln, the company has several patents pending on the improved technology. And in the long term, licensing isn't out of the question, said Grant and WaveRider President Clarke.

The entrepreneurial spirit Grant displayed has followed him throughout his career. Earlier in the nineties, Grant got into the ISP business thanks to a failed consulting contract. Grant lost the contract because he was unable to provide consistent service via his ISP, which was based in rural Canada. Annoyed Grant sent out a survey to the ISP's subscribers to see what they thought about the company's service.

When the ISP found out what Grant had done, it terminated his service. "I needed ISP service, so I started my own," said Grant. "I decided to provide the kind of service that I wanted when I was a subscriber. Using an intense advertising campaign in the initial start-up period, I was able to take two thirds of my rival's customer base in three months. Within six months they shut their doors."

Given WaveRider's expert senior management and Grant's technological and market savvy, the future bodes well for the company. "We're cognizant of not trying to do too much right now," said Clarke. "We are looking to LMDS for the future and are having active discussions. On the network side we already have the data taken care of. Is there a voice application we can tie to it?" Only time will tell, but if previous successes are any indication, the LMDS market has an unseen player coming its way.

Geoff Livingston is an editor for CommunicationsNOW and contributes to Inside Paging and WirelessNOW. In addition, Geoff is the editor of CommNOW's latest new product, Inside Wireless Internet, a newsletter publication dedicated to the provision of wireless Internet services. Stay close for more details about Inside Wireless Internet. Geoff can be reached at 202-530-7600, or you can contact him via e-mail at <gliving@commnow.com>.

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## 7. Re: [SS:1840] Philips Semiconductors Delivers Complete Vestigial Side Band So...

From: N5RG <N5RG@aol.com>  
Date: Fri, 5 Dec 1997 11:48:10 EST  
To: ss@tapr.org  
Message-ID: <b42e78f7.3488313e@aol.com>  
Rendered body type: text/plain

>  
> VSB Tuner Front End and Channel Decoder Chipset Provides Complete  
> Solution For Emerging DTV Standards in the US and Abroad  
>

Sounds like a great chipset to me. When are Amateurs going to start doing DTV? Maybe we can use this chipset for both TV and for general purpose digital applications sending anything at 19.4 mbits/sec. This could make Amateur TV extremely useful.

73, Roy W7IDM, ex N5RG



## 8. Re: [SS:1842] WAVERIDER READIES LAST MILE SOLUTION LAUNCH

From: bm@lynx.ve3jf.ampr.org  
Date: Fri, 5 Dec 1997 21:46:04 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <199712052146.VAA32746@lynx.ve3jf.ampr.org>  
Rendered body type: text/plain

Dewayne Hendricks <dewayne@warpspeed.com> wrote:

>  
> Note: I am posting this to the SS list because I thought that it would be  
> of general interest. This product offering, if indeed it can do all that  
> they say, at the price point they claim, makes it a cut above the rest of  
> the Part 15 products now on the market.  
> BTW, their website is <<http://www.waverider.ca/>>. Check it out!

I hope this turns out to be real, but I'm a bit skeptical. Their promotion in advance of having actual product to supply is reminiscent of some purveyors of vaporhardware that have been mentioned here before. I got some email from the Waverider people a couple of months ago, asking me to add them to my LAN/MAN modem product directory. I replied saying I'd heard from others that Waverider was not delivering any hardware yet (in fact, I think they try and sell you a franchise). I asked if that had changed - I got no reply.

So, caveat emptor and all that...

Barry

--

|                             |                                                                      |
|-----------------------------|----------------------------------------------------------------------|
| Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca                                       |
| Ottawa Amateur Radio Club   | AMPRnet: bm@lynx.ve3jf.ampr.org                                      |
| Packet Working Group        | Web: <a href="http://hydra.carleton.ca">http://hydra.carleton.ca</a> |

---

## 9. Re: [SS:1843] Re: Philips Semiconductors Delivers Complete Vestigial Side Band So...

From: hoelzen@trib.com  
Date: Fri, 5 Dec 1997 15:43:55 -0700  
To: ss@tapr.org  
Message-ID: <199712052243.PAA12232@home3.trib.com>  
Rendered body type: text/plain

At 11:34 AM 12/5/97 -0600, you wrote:

>>  
>> VSB Tuner Front End and Channel Decoder Chipset Provides Complete  
>> Solution For Emerging DTV Standards in the US and Abroad  
>>  
>  
>Sounds like a great chipset to me. When are Amateurs going to start  
>doing DTV? Maybe we can use this chipset for both TV and for general  
>purpose digital applications sending anything at 19.4 mbits/sec. This  
>could make Amateur TV extremely useful.  
>  
>73, Roy W7IDM, ex N5RG  
>  
>

I took a look at the data sheets (PDF file from Philips WWW page) It looks like it has all the IF blocks needed for a range of applications, not limited to ATV.

Parts come in DIP or SMT and are under \$3 in 10,000 quan.....

73, Chuck KC7BNC

---

## 10. Time Billing Professionals!

From: YeawAVaxp@top1story.net  
Date: 05 Dec 10 12:07:35 AM  
To: Pros@time4u.net  
Message-ID: <ZKKC4kULdPx>  
Rendered body type: text/plain

BQE Software has recently released a new 32 bit version of its enormously popular Time/Billing software, BillQuick!

Feedback on the program has been tremendous. Accountants, Architects, Attorneys, Engineers, Computer Consultants and Programmers from all over the world have found BillQuick to be the Time Billing solution they've been searching

for!

Make sure to visit our web site and download the easy to use, feature rich and flexible Time/Billing software. Free Download <http://www.bqe.com>

BQE Software  
<http://www.bqe.com>

P.S. Coming soon: A time and expense web interface module for BillQuick.  
Scheduled release: 1st quarter 1998

If you are interested in reselling BillQuick, please contact us. Generous commissions are being offered.  
>

---

## 11. Qualcomm Engineer on Bail in Rusia

From: Darryl Smith <vk2tds@ozemail.com.au>  
Date: Sat, 06 Dec 1997 18:36:29 +1100  
To: ss@tapr.org  
Message-ID: <3489007C.6608851F@ozemail.com.au>  
Rendered body type: text/plain

I just was a report on the news here in Australia on an Engineer from the USA in Russia charged with espionage - His crime? Having a GPS reciever.

The News story inferred that the engineer was from Qualcomm, and that the company had paid \$8,000,000 bail.

The news showed a Garmin 45 mainly as the type used by the engineer.

Maybe there will be some more in the next few days.

Darryl

P.S. For all those I met in the USA for the DCC, Thanks for your hospitality. If any of you are ever planning to come to Australia please send me some email; I may even be able to arrange some accomadation.

---

## 12. Time Billing Professional

From: ws5jgH8Cq@briieflyheavy.com  
Date: 05 Dec 10 9:18:04 AM  
To: profess@timebill.net  
Message-ID: <J2zBz3KIm01u>  
Rendered body type: text/plain

BQE Software has recently released a new 32 bit version of its enormously popular Time/Billing software, BillQuick!

Feedback on the program has been tremendous. Accountants, Architects, Attorneys, Engineers, Computer Consultants and Programmers from all over the world have found BillQuick to be the Time Billing solution they've been searching for!

Make sure to visit our web site and download the easy to use, feature rich and flexible Time/Billing software. Free Download <http://www.bqe.com>

BQE Software  
<http://www.bqe.com>

P.S. Coming soon: A time and expense web interface module for BillQuick.  
Scheduled release: 1st quarter 1998

If you are interested in reselling BillQuick, please contact us. Generous commissions are being offered.  
>

---

## 13. SS in UK

From: Lee Wiltshire <lee@jamjar.demon.co.uk>  
Date: Sun, 7 Dec 1997 18:06:12 +0000  
To: ss@tapr.org  
Message-ID: <srXzbCAUWui0EwfT@jamjar.demon.co.uk>

Rendered body type: text/plain

Hi all,

I've been watching the SS reflector for a while, and so far I've seen nothing about any Ham Spread-Spectrum in the UK.

Is there anybody out there who is doing, or is interested in doing some experiments with SS in England? The only person who I've found is James Vincent, G1PVZ, who published the results of some experiments he did some time ago.

I have been reading through my licence conditions and (so far as I can see) there is nothing that precludes me from using "bandwidth expansion" techniques, so long as I don't use more bandwidth than necessary. The only pitfall is that I mustn't use secret codes or ciphers. Therefore, if I make sure that whatever PN sequences I use are published beforehand (via RadCom and a home page perhaps), then I am staying within my licence conditions.

I'm interested in experimenting on 2.4GHz initially (as I have access to antennas and equipment), but am not averse to lower frequency bands (oops, I think that might stir up a hornet's nest!).

So, is SS only of interest to US Hams, or are there people in the UK who are interested?

Lee.....

Lee Wiltshire G0IAY

---

#### 14. Re: [SS:1849] SS in UK

From: Dirk Koopman <djk@tobit.co.uk>  
Date: Sun, 7 Dec 1997 21:11:20 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <Pine.LNX.3.96.971207210939.416A-100000@dirku.tobit.co.uk>  
Rendered body type: text/plain

On Sun, 7 Dec 1997, Lee Wiltshire wrote:

> Hi all,  
>  
> I've been watching the SS reflector for a while, and so far I've seen  
> nothing about any Ham Spread-Spectrum in the UK.  
>  
> Is there anybody out there who is doing, or is interested in doing some  
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>  
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> techniques, so long as I don't use more bandwidth than necessary. The  
> only pitfall is that I mustn't use secret codes or ciphers. Therefore,  
> if I make sure that whatever PN sequences I use are published beforehand  
> (via RadCom and a home page perhaps), then I am staying within my  
> licence conditions.  
>  
> I'm interested in experimenting on 2.4GHz initially (as I have access to  
> antennas and equipment), but am not averse to lower frequency bands  
> (oops, I think that might stir up a hornet's nest!).  
>  
> So, is SS only of interest to US Hams, or are there people in the UK who  
> are interested?  
>

You can add me to the list. Unfortunately, if the RA catch you doing it, you may find they have a less sympathetic interpretation of the licence! I have made the mistake of asking...

Dirk

--

Dirk-Jan Koopman      Tel/Fax: +44 1362 696076 Mobile: +44 973 333806  
Computer Consultant   Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU  
"The typewriting machine, when played with expression, is no more annoying than the piano when played by a sister or near relation." --Oscar Wilde

---

#### 15. RE: [SS:1850] Re: SS in UK

From: Jason.Singleton@ATN.PNG.PO.gpt.co.uk  
Date: Mon, 08 Dec 1997 09:04:19 -0300 (BST)  
To: ss@tapr.org  
Message-ID: <02B88B3481733A7C\*02B88B3481733A7C#064#PONF01.GPT@SMF.gpt.co.uk>  
Rendered body type: text/plain

Hello everyone,

Dirk-Jan Koopman wrote:

>You can add me to the list. Unfortunately, if the RA catch you doing it,  
>you may find they have a less sympathetic interpretation of the licence! I  
>have made the mistake of asking...

You can count me in too. I've experimented a little bit with DSSS using the Prism chipset in the ISM band at 2.45 GHz. I replaced the HSP 3824 baseband processor with an SX043 spread spectrum transceiver IC, mainly because it seemed to be easier to program and saved a couple of extra devices (IC to program the dual synthesizer for example). Results weren't too good but it was encouraging enough to start on version 2.

I made the bigger mistake of asking about the licence in uk.radio.amateur... ;-)

Byeee

Jason Singleton G70DQ  
jason.singleton@atn.png.po.gpt.co.uk

---

## 16. Re: [SS:1851] Re: SS in UK

From: Dirk Koopman <djk@tobit.co.uk>  
Date: Mon, 8 Dec 1997 11:20:54 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <Pine.LNX.3.96.971208111616.416C-100000@dirku.tobit.co.uk>  
Rendered body type: text/plain

On Mon, 8 Dec 1997 Jason.Singleton@atn.png.po.gpt.co.uk wrote:

> You can count me in too. I've experimented a little bit with DSSS using  
> the Prism chipset in the ISM band at 2.45 GHz. I replaced the HSP 3824  
> baseband processor with an SX043 spread spectrum transceiver IC, mainly  
> because it seemed to be easier to program and saved a couple of extra  
> devices (IC to program the dual synthesizer for example). Results  
> weren't too good but it was encouraging enough to start on version 2.

Please tell us all more. Incidentally, where did you get the parts from and how much. When I tried (admittedly soon after the harris parts came out) they said they wouldn't be able to supply parts in small quantities (and they were going to charge lots anyway)

>  
> I made the bigger mistake of asking about the licence in  
> uk.radio.amateur... ;-)  
>

There is the potential for a whole thread here... but I am no longer able to comment as I have successfully avoided looking at this "news" group for nearly a year ;-)

Dirk

--

Dirk-Jan Koopman      Tel/Fax: +44 1362 696076 Mobile: +44 973 333806  
Computer Consultant   Email: djc@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU  
"The typewriting machine, when played with expression, is no more annoying than the piano when played by a sister or near relation." --Oscar Wilde

---

## 17. Re: [SS:1849] SS in UK

From: Graham Cheater <graham.cheater@dial.pipex.com>  
Date: Mon, 08 Dec 1997 19:59:42 +0000  
To: ss@tapr.org  
Cc: Graham\_cheater@hp.com  
Message-ID: <348C51AE.9D886207@dial.pipex.com>  
Rendered body type: text/plain

Lee, I would be most interested in taking part in any trial of SS in the UK, I am just returning to the radio after a long absence, and have had some extensive experience with SS in the Military Satcom arena.

Graham Cheater G4FUA, Bristol, UK. My Home Page (new)

PS: I did approach this 'opportunity' before and found the RSGB most

helpfull in clarifying the 'legal' aspects.

=====

Lee Wiltshire wrote:

```
> Hi all,
>
> I've been watching the SS reflector for a while, and so far I've seen
> nothing about any Ham Spread-Spectrum in the UK.
>
> Is there anybody out there who is doing, or is interested in doing some
> experiments with SS in England? The only person who I've found is James
> Vincent, G1PVZ, who published the results of some experiments he did
> some time ago.
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> I have been reading through my licence conditions and (so far as I can
> see) there is nothing that precludes me from using "bandwidth expansion"
> techniques, so long as I don't use more bandwidth than necessary. The
> only pitfall is that I mustn't use secret codes or ciphers. Therefore,
> if I make sure that whatever PN sequences I use are published beforehand
> (via RadCom and a home page perhaps), then I am staying within my
> licence conditions.
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> I'm interested in experimenting on 2.4GHz initially (as I have access to
> antennas and equipment), but am not averse to lower frequency bands
> (oops, I think that might stir up a hornet's nest!).
>
> So, is SS only of interest to US Hams, or are there people in the UK who
> are interested?
>
> Lee.....
>
>
> Lee Wiltshire G0IAY
```

---

## 18. Re: [SS:1849] SS in UK

From: Graham Cheater <graham.cheater@dial.pipex.com>  
Date: Mon, 08 Dec 1997 20:29:52 +0000  
To: ss@tapr.org  
Cc: Graham\_cheater@hp.com  
Message-ID: <348C58C0.8F18E9F4@dial.pipex.com>  
Rendered body type: text/plain

Lee, I would be most interested in taking part in any trial of SS in the UK, I am just returning to the radio after a long absence, and have had some extensive experience with SS in the Military Satcom arena.

Graham Cheater G4FUA, Bristol, UK. My Home Page (new)

PS: I did approach this 'opportunity' before and found the RSGB most helpfull in clarifying the 'legal' aspects.

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> licence conditions.
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> antennas and equipment), but am not averse to lower frequency bands
> (oops, I think that might stir up a hornet's nest!).
>
```

> So, is SS only of interest to US Hams, or are there people in the UK who  
> are interested?  
>  
> Lee.....  
>  
>  
> Lee Wiltshire G0IAY

---

## 19. Re: [SS:1849] SS in UK

From: Graham Cheater <graham.cheater@dial.pipex.com>  
Date: Mon, 08 Dec 1997 20:34:55 +0000  
To: ss@tapr.org  
Cc: Graham\_cheater@hp.com  
Message-ID: <348C59EF.CF1BEAEA@dial.pipex.com>  
Rendered body type: text/plain

Lee, I would be most interested in taking part in any trial of SS in the UK, I am just returning to the radio after a long absence, and have had some extensive experience with SS in the Military Satcom arena.

Graham Cheater G4FUA, Bristol, UK. My Home Page (new)

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> So, is SS only of interest to US Hams, or are there people in the UK who  
> are interested?  
>  
> Lee.....  
>  
>  
> Lee Wiltshire G0IAY

---

## 20. Re: [SS:1849] SS in UK

From: Graham Cheater <graham.cheater@dial.pipex.com>  
Date: Mon, 08 Dec 1997 20:36:42 +0000  
To: ss@tapr.org  
Cc: Graham\_cheater@hp.com  
Message-ID: <348C5A5A.635F8D86@dial.pipex.com>  
Rendered body type: text/plain

Lee, I would be most interested in taking part in any trial of SS in the UK, I am just returning to the radio after a long absence, and have had some extensive experience with SS in the Military Satcom arena.

Graham Cheater G4FUA, Bristol, UK. My Home Page (new)

PS: I did approach this 'opportunity' before and found the RSGB most helpfull in clarifying the 'legal' aspects.

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Lee Wiltshire wrote:

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>  
> So, is SS only of interest to US Hams, or are there people in the UK who  
> are interested?  
>  
> Lee.....  
>  
>  
> Lee Wiltshire G0IAY

## 21. Re: [SS:1849] SS in UK

From: Graham Cheater <graham.cheater@dial.pipex.com>  
Date: Mon, 08 Dec 1997 20:38:29 +0000  
To: ss@tapr.org  
Cc: Graham\_cheater@hp.com  
Message-ID: <348C5AC5.990FD4CF@dial.pipex.com>  
Rendered body type: text/plain

Lee, I would be most interested in taking part in any trial of SS in the UK,  
I am just returning to the radio after a long absence, and have had some  
extensive experience with SS in the Military Satcom arena.

Graham Cheater G4FUA, Bristol, UK. My Home Page (new)

PS: I did approach this 'opportunity' before and found the RSGB most  
helpful in clarifying the 'legal' aspects.

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Lee Wiltshire wrote:

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> see) there is nothing that precludes me from using "bandwidth expansion"  
> techniques, so long as I don't use more bandwidth than necessary. The  
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> are interested?  
>  
> Lee.....  
>

>  
> Lee Wiltshire G0IAY

---

## 22. Re: [SS:1849] SS in UK

From: Graham Cheater <graham.cheater@dial.pipex.com>  
Date: Mon, 08 Dec 1997 20:40:10 +0000  
To: ss@tapr.org  
Cc: Graham\_cheater@hp.com  
Message-ID: <348C5B2A.A058A962@dial.pipex.com>  
Rendered body type: text/plain

Lee, I would be most interested in taking part in any trial of SS in the UK, I am just returning to the radio after a long absence, and have had some extensive experience with SS in the Military Satcom arena.

Graham Cheater G4FUA, Bristol, UK. My Home Page (new)

PS: I did approach this 'opportunity' before and found the RSGB most helpfull in clarifying the 'legal' aspects.

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Lee Wiltshire wrote:

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> So, is SS only of interest to US Hams, or are there people in the UK who  
> are interested?  
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> Lee.....  
>  
>  
> Lee Wiltshire G0IAY

---

## 23. Re: [SS:1849] SS in UK

From: Graham Cheater <graham.cheater@dial.pipex.com>  
Date: Mon, 08 Dec 1997 20:42:56 +0000  
To: ss@tapr.org  
Cc: Graham\_cheater@hp.com  
Message-ID: <348C5BCF.DCC09F64@dial.pipex.com>  
Rendered body type: text/plain

Lee, I would be most interested in taking part in any trial of SS in the UK, I am just returning to the radio after a long absence, and have had some extensive experience with SS in the Military Satcom arena.

Graham Cheater G4FUA, Bristol, UK. My Home Page (new)

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> So, is SS only of interest to US Hams, or are there people in the UK who  
> are interested?  
>  
> Lee.....  
>  
>  
> Lee Wiltshire G0IAY

---

## 24. Re: [SS:1849] SS in UK

From: Graham Cheater <graham.cheater@dial.pipex.com>  
Date: Mon, 08 Dec 1997 20:43:07 +0000  
To: ss@tapr.org  
Cc: Graham\_cheater@hp.com  
Message-ID: <348C5BDB.D50964C8@dial.pipex.com>  
Rendered body type: text/plain

Lee, I would be most interested in taking part in any trial of SS in the UK,  
I am just returning to the radio after a long absence, and have had some  
extensive experience with SS in the Military Satcom arena.

Graham Cheater G4FUA, Bristol, UK. My Home Page (new)

PS: I did approach this 'opportunity' before and found the RSGB most  
helpfull in clarifying the 'legal' aspects.

=====

Lee Wiltshire wrote:

> Hi all,  
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> I've been watching the SS reflector for a while, and so far I've seen  
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> are interested?  
>  
> Lee.....  
>  
>  
> Lee Wiltshire G0IAY

---

## 25. Graham Cheater

From: Guy Story <GStory@icomply.com>  
Date: Mon, 8 Dec 1997 16:09:02 -0600  
To: "'ss@tapr.org'" <ss@tapr.org>  
Message-ID: <c=US%a=\_%p=LEW%l=LEW\_PRODS1-971208220902Z-3835@lew\_prods1.icomply.com>  
Rendered body type: text/plain

I just wanted to make sure I was not having a problem with my email. I have received 8 copies of Graham's email. Has anyone else had this happen.

Nothing personal Graham, never had this happen before.  
Guy Story, KC5G0I  
gstory@icomply.com

---

## 26. Re: SS in UK?

From: Jan Schiefer <jas@hplb.hpl.hp.com>  
Date: Mon, 8 Dec 97 22:53:02 GMT  
To: ss@tapr.org  
Message-ID: <199712082253.AA080211582@pooh.hpl.hp.com>  
Rendered body type: text/plain

This must be one of the nicest examples of recursive inclusion I have seen for a while.

> Lee, I would be most interested in taking part in any trial of SS in the UK,  
> [..]  
> Graham Cheater G4FUA, Bristol, UK. My Home Page (new)

What a shame, just as I am about to leave Bristol...

Cheers,  
Jan dl5ue, g0trr

--

Jan Schiefer, g0trr, jas@hpl.hp.com, HP Labs Bristol, UK. +44 117 922 8344  
Finally, I discovered a way to create lines longer than 80 columns, even on term

---

## 27. Re: [SS:1861] Graham Cheater

From: Shawn Cherewick <scherewi@netcom.ca>  
Date: Mon, 08 Dec 1997 14:51:33 -0800  
To: ss@tapr.org, GStory@icomply.com  
Message-ID: <348C79F3.C603363@netcom.ca>  
Rendered body type: text/plain

Hi Guy,

It's not your email, I have also received 8 copies of the same message from Graham. I've never seen this happen before either. Strange?

Shawn Cherewick, VE7IPX  
scherewi@netcom.ca.

Guy Story wrote:

> I just wanted to make sure I was not having a problem with my email. I  
> have received 8 copies of Graham's email. Has anyone else had this  
> happen.  
> Nothing personal Graham, never had this happen before.  
> Guy Story, KC5G0I  
> gstory@icomply.com

---

## 28. RE: [SS:1852] Re: SS in UK

From: Jason.Singleton@ATN.PNG.P0.gpt.co.uk  
Date: Tue, 09 Dec 1997 13:09:50 -0300 (BST)  
To: ss@tapr.org  
Message-ID: <B3428D3481733A7C\*B3428D3481733A7C#064#PONF01.GPT@SMF.gpt.co.uk>  
Rendered body type: text/plain

Hi everyone,

Dirk-Jan Koopman write:  
>Please tell us all more. Incidentally, where did you get the parts from  
>and how much. When I tried (admittedly soon after the harris parts came  
>out) they said they wouldn't be able to supply parts in small quantities  
>(and they were going to charge lots anyway)

Okay, here goes...

Costs  
-----

The 2 Prism chipsets were samples obtained around June 1996. Last price quote I saw was \$60 for quantities of 10,000. From Harris Semiconductor themselves[1].

The SX043 Transceivers were bought from a company called Sabre Advanced Microelectronics [2]. The price I was quoted was 50 ukp each. This was in January 1997.

The data rate used was 256,000 bits / second - an odd rate but as specified in the data sheet for the SX043. PN Code length selected was 31 bit giving a process gain of around 14.4dB and a main lobe bandwidth of around 16.3 MHz. Modulation used was BPSK.

I decided to have 4 channels available on this - at 16.3 MHz steps within the 2.4 - 2.4835 GHz ISM band. The chipset required 2 local oscillators - SHF and UHF. The SHF VCO I used was centred around 2.25 GHz.

The UHF VCO was on 420 MHz. This was just an old VCO ripped out of a mobile phone so didn't really cost anything. No real reason why a VCO is needed for the UHF side except that it was available and didn't require as much tuning and board space as a normal crystal oscillator / multiplier circuit. This was divided by 2 inside the Harris I/Q Modem. Bandpass filters used were typical WLAN types appearing in the Cirkit catalogue about a year ago.

I mentioned replacing the HSP 3824. This was done mainly because it needed extra devices (Buffer mem, AMD PCNET? device) to convert between the serial data stream and parallel data for the interface to a PC (via an ISA interface). The SX043 I replaced it with could do something like this on chip. It also had better documentation and clearly explained how acquisition and tracking the incoming signal could be achieved. Finally it had a serial bus which was designed to program frequency synthesizers, this meant I could put channel selection inside the PC and not need an EPROM or a PIC to program the synthesizer. Everything was put onto PTFE PCB material with a dielectric constant of 3.2.

The PC interface was only a couple of '245 buffers connected to an 8 bit ISA card with some address decoding giving a choice of 2 address ranges. I should point out that the transceiver was outside of the PC with the ISA interface connected by a very short ribbon cable. (YIKES! - tried to minimise crosstalk as much as possible:-).

The software written was very basic. My intention was not to provide a network driver but just to demonstrate DSSS. Therefore the software only did terminal to terminal contacts / file transfer. The software was able to program and read the status / control registers on the transceiver and change the channel as well as send and receive data. No kind of packet formatting was used - I just sent the data out the transmitter in a raw format. Packet format will come later.

Antenna used was the typical omnidirectional 'rubber duck' style antenna mounted on top of the transceiver metal box.

Two of these transceivers were built for demonstration in a lab. Receive performance was not very good and while I was selecting components I was warned that Prism needed a lot of software for error recovery. My main problem was that I was working on a university campus and suffering from microwave oven interference in the nearby

student village. But data was being transferred across the lab!

The future

-----

Apart from getting the radio to work more reliably I want to be able to write an interface for something like UKNOS or one of its equivalents. I know that the direction of development seems to be more towards Win95, for now I just want to make the transceiver work in the present network. The ability to change channel in software could give something a bit more flexible on busy channels.

That's about all I can remember sitting here at work...

[1] Harris Semiconductor. Tel +44 (0) 1189 32 85 85.

[2] Sabre Advanced Microelectronics. sales@sabreadv.demon.co.uk  
+44 (0) 1483 35 444. They gave me a discount so I 'spose I'd better mention them :-)

Byeee

Jason G70DQ  
jason.singleton@atn.png.po.gpt.co.uk

---

## 29. RE: [SS:1864] Re: SS in UK

From: Jason.Singleton@ATN.PNG.PO.gpt.co.uk  
Date: Tue, 09 Dec 1997 13:55:12 -0300 (BST)  
To: ss@tapr.org  
Message-ID: <6A4A8D3481733A7C\*6A4A8D3481733A7C#064#PONF01.GPT@SMF.gpt.co.uk>  
Rendered body type: text/plain

Damn, sorry about the line lengths - I assumed Microsoft Mail was intelligent enough to deal with them.

Here is an easier read version.

Hi everyone,

Dirk-Jan Koopman wrote:

>Please tell us all more. Incidentally, where did you get the parts from  
>and how much. When I tried (admittedly soon after the harris parts came  
>out) they said they wouldn't be able to supply parts in small quantities  
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The 2 Prism chipsets were samples obtained around June 1996. Last price quote I saw was \$60 for quantities of 10,000. From Harris Semiconductor themselves[1].

The SX043 Transceivers were bought from a company called Sabre Advanced Microelectronics [2]. The price I was quoted was 50 ukp each. This was in January 1997.

The data rate used was 256,000 bits / second - an odd rate but as specified in the data sheet for the SX043. PN Code length selected was 31 bit giving a process gain of around 14.4dB and a main lobe bandwidth of around 16.3 MHz. Modulation used was BPSK.

I decided to have 4 channels available on this - at 16.3 MHz steps within the 2.4 - 2.4835 GHz ISM band. The chipset required 2 local oscillators - SHF and UHF. The SHF VCO I used was centred around 2.25 GHz.

The UHF VCO was on 420 MHz. This was just an old VCO ripped out of a mobile phone so didn't really cost anything. No real reason why a VCO is needed for the UHF side except that it was available and didn't require as much tuning and board space as a normal crystal oscillator / multiplier circuit. This was divided by 2 inside the Harris I/Q Modem. Bandpass filters used were typical WLAN types appearing in the Cirkit catalogue about a year ago.

I mentioned replacing the HSP 3824. This was done mainly because it needed extra devices (Buffer mem, AMD PCNET? device) to convert

between the serial data stream and parallel data for the interface to a PC (via an ISA interface). The SX043 I replaced it with could do something like this on chip. It also had better documentation and clearly explained how acquisition and tracking the incoming signal could be achieved. Finally it had a serial bus which was designed to program frequency synthesizers, this meant I could put channel selection inside the PC and not need an EPROM or a PIC to program the synthesizer. Everything was put onto PTFE PCB material with a dielectric constant of 3.2.

The PC interface was only a couple of '245 buffers connected to an 8 bit ISA card with some address decoding giving a choice of 2 address ranges. I should point out that the transceiver was outside of the PC with the ISA interface connected by a very short ribbon cable. (YIKES! - tried to minimise crosstalk as much as possible:-).

The software written was very basic. My intention was not to provide a network driver but just to demonstrate DSSS. Therefore the software only did terminal to terminal contacts / file transfer. The software was able to program and read the status / control registers on the transceiver and change the channel as well as send and receive data. No kind of packet formatting was used - I just sent the data out the transmitter in a raw format. Packet format will come later.

Antenna used was the typical omnidirectional 'rubber duck' style antenna mounted on top of the transceiver metal box.

Two of these transceivers were built for demonstration in a lab. Receive performance was not very good and while I was selecting components I was warned that Prism needed a lot of software for error recovery. My main problem was that I was working on a university campus and suffering from microwave oven interference in the nearby student village. But data was being transferred across the lab!

The future

-----

Apart from getting the radio to work more reliably I want to be able to write an interface for something like UKNOS or one of its equivalents. I know that the direction of development seems to be more towards Win95, for now I just want to make the transceiver work in the present network. The ability to change channel in software could give something a bit more flexible on busy channels.

That's about all I can remember sitting here at work...

[1] Harris Semiconductor. Tel +44 (0) 1189 32 85 85.

[2] Sabre Advanced Microelectronics. sales@sabreadv.demon.co.uk  
+44 (0) 1483 35 444. They gave me a discount so I 'spose I'd better mention them :-)

Byeee

Jason G70DQ  
jason.singleton@atn.png.po.gpt.co.uk

---

### 30. Re: [SS:1847] Qualcomm Engineer on Bail in Rusia

From: LNUSSAT.JMALMBER@eds.com  
Date: Tue, 9 Dec 1997 11:21:33 -0500  
To: ss <ss@tapr.org>  
Message-ID: <0095000007098087000002L072\*@MHS>  
Rendered body type: text/plain

Sorry for sending this to the mailing list, but my E-Mail service does not show me any originating E-MAIL address, or provide me with any way of getting them.

All messages on this list show up to me as TO: SS[INET.SS]@DIAMOND FROM: SS[INET.SS]@DIAMOND.

A ham from Maury County Tn is now in Austraila.  
Darryl, if you can send me your E-MAIL address, I will find out his and send it to you.

Thankyou,

John Malmberg

Email: LNUSSAT.jmalMBER@GMEDS.COM

P.S.

This E-mail system does not like attachments. It generates 4 complaint messages to me for every attachment that I receive.

---

### 31. Re: [SS:1865] Re: SS in UK

From: "David VanHorn" <dvanhorn@cedar.net>  
Date: Tue, 9 Dec 1997 12:17:07 -0500  
To: <ss@tapr.org>  
Message-ID: <199712091727.LAA02036@www.cedar.net>  
Rendered body type: text/plain

```
begin 666 MESSAGE.TXT
M#0HM+2TM+4JR:6=I;F%L($UE<W-A9V4M+2TM+0T*1G)0;3H@2F%S;VXN4VEN
M9VQE=&]N0&%T;BYP:F<N<&\N9W!T+F-0+G5K(#Q*87-0;BY3:6YG;&ST;VY
M871N+G!N9RYP;RYG<'0N8V\N=6L^#0I4;SH@<W- =8%P<BY0<F<@/'-S0'1A
M<'(N;W)G/@T*1&%T93H@5'SE<V1A>2P@1&5C96UB97(@, #DL(#$Y.3<@,3(Z
M,C8@4$T-"E-U8FIE8W0Z(%M34SHQ.#8U72!293H@4U,@:6X@54L-"@T*#0H_
M/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/
M/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/
M/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/3\T/S\_/_/S\_/_/S\_/_/S\_/_/
M/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/S\_/_/
J"@T*07)E('E0=2!P;W-T:6YG(&EN('-P<F5A9"!S<&5C=')U;3\-"@T*
`
end
```

---

### 32. Re: [SS:1861] Graham Cheater

From: Lee Wiltshire <lee@jamjar.demon.co.uk>  
Date: Tue, 9 Dec 1997 19:16:45 +0000  
To: ss@tapr.org  
Message-ID: <FBg9pBAdkZj0EwhS@jamjar.demon.co.uk>  
Rendered body type: text/plain

I got it several times too! Thought for a second I was being flamed!

In message <c=US%a=\_%p=LEW%l=LEW\_PRODS1-971208220902Z-3835@lew\_prods1.icomply.com>, Guy Story <GStory@icomply.com> writes  
>I just wanted to make sure I was not having a problem with my email. I  
>have received 8 copies of Graham's email. Has anyone else had this  
>happen.  
> Nothing personal Graham, never had this happen before.  
>Guy Story, KC5GOI  
>gstory@icomply.com  
>

--  
Lee Wiltshire G0IAY

---

### 33. SS in UK

From: Lee Wiltshire <lee@jamjar.demon.co.uk>  
Date: Tue, 9 Dec 1997 20:03:13 +0000  
To: ss@tapr.org  
Message-ID: <zCHAZIABQaj0EwWA@jamjar.demon.co.uk>  
Rendered body type: text/plain

Well, it sounds like at least one person has got further than I have!

I must admit to not reading uk.radio.amateur for some time, as the last time I downloaded anything from that particular newsgroup, it was full of snipe and counter-snipe! (In other words a complete waste of bandwidth!)

My first plan was to experiment with direct sequence, probably using the Stanford Telecom chipset (if I can get hold of them at a reasonable price!), although there seems to be a fair amount of choice now. Is anybody out there (US or UK) able to get hold of these chips at reasonable costs? (Is there a possibility for a TAPR group purchase?)

The work that Jason has done sounds interesting, I guess most of it was done at University?

On the subject of licencing, the impression I got when talking to various RSGB committee members was that the reason nothing has been written down (in the licence) is that no-one has really asked.

I'll keep my eye on this newsgroup and see what happens.

Lee

Lee Wiltshire G0IAY

lee@jamjar.demon.co.uk

---

### 34. Re: [SS:1861] et al. Appologies!

From: Graham Cheater <graham.cheater@dial.pipex.com>  
Date: Tue, 09 Dec 1997 21:55:01 +0000  
To: ss@tapr.org  
Cc: lee@jamjar.demon.co.uk  
Message-ID: <348DBE35.1342F73D@dial.pipex.com>  
Rendered body type: text/plain

When responding to the posting from Lee Wiltshire G0IAY, [SS in the UK] Netscape Communicator gave me an error-msg:

" Can't open 'Sent' mail file, Message not sent!" So, being kinda gullable, I believed it.....

The remaining seven copies of the same message wee my attempts to fix the problem and get the message sent!.

Truely sorry, this was not a 'flaming' attempt.

Lee I will follow up on the latest posting later in the week, busy right now.

Regards grahamC G4FUA ( ONE Copy I HOPE!)

graham.cheater@dial.pipex.com

---

### 35. RE: [SS:1869] SS in UK

From: Jason.Singleton@ATN.PNG.PO.gpt.co.uk  
Date: Wed, 10 Dec 1997 14:00:12 -0300 (BST)  
To: ss@tapr.org  
Message-ID: <739F8E3481733A7C\*739F8E3481733A7C#064#PONF01.GPT@SMF.gpt.co.uk>  
Rendered body type: text/plain

Hi,

Lee Wiltshire G0IAY wrote:

>

>My first plan was to experiment with direct sequence, probably using  
>the Stanford Telecom chipset (if I can get hold of them at a reasonable  
>price!), although there seems to be a fair amount of choice now. Is  
>anybody out there (US or UK) able to get hold of these chips at  
>reasonable costs? (Is there a possibility for a TAPR group purchase?)

Does the Stanford Telecom chipset deal with RF as well as the digital stuff?  
The suggestion for a group purchase sounds a good idea, wouldn't we  
need to be members of TAPR first?

>The work that Jason has done sounds interesting, I guess most of it was  
>done at University?

Yes, I started collecting info and components before my final year  
(1996 - 1997) Since I started the project at University it seems  
several more chipsets became available. After graduating I made sure  
the transceivers left with me!

>On the subject of licencing, the impression I got when talking to  
>various RSGB comittee members was that the reason nothing has been  
>written down (in the licence) is that no-one has really asked.

Ah, I assumed that because nothing was written down in the licence it  
was okay to do...

>I'll keep my eye on this newsgroup and see what happens.  
Or start the ball rolling... ;-)

Byeee

Jason G70DQ

jason.singleton@atn.png.po.gpt.co.uk

---

### 36. RE: [SS:1869] SS in UK

From: Jason.Singleton@ATN.PNG.PO.gpt.co.uk  
Date: Wed, 10 Dec 1997 14:00:12 -0300 (BST)  
To: ss@tapr.org  
Message-ID: <749F8E3481733A7C\*749F8E3481733A7C#064#PONF01.GPT@SMF.gpt.co.uk>  
Rendered body type: text/plain

Hi,

Lee Wiltshire G0IAY wrote:

>

>My first plan was to experiment with direct sequence, probably using  
>the Stanford Telecom chipset (if I can get hold of them at a reasonable  
>price!), although there seems to be a fair amount of choice now. Is  
>anybody out there (US or UK) able to get hold of these chips at  
>reasonable costs? (Is there a possibility for a TAPR group purchase?)

Does the Stanford Telecom chipset deal with RF as well as the digital stuff?  
The suggestion for a group purchase sounds a good idea, wouldn't we  
need to be members of TAPR first?

>The work that Jason has done sounds interesting, I guess most of it was  
>done at University?

Yes, I started collecting info and components before my final year  
(1996 - 1997) Since I started the project at University it seems  
several more chipsets became available. After graduating I made sure  
the transceivers left with me!

>On the subject of licencing, the impression I got when talking to  
>various RSGB comittee members was that the reason nothing has been  
>written down (in the licence) is that no-one has really asked.

Ah, I assumed that because nothing was written down in the licence it  
was okay to do...

>I'll keep my eye on this newsgroup and see what happens.  
Or start the ball rolling... ;-)

Byeee  
Jason G7ODQ  
jason.singleton@atn.png.po.gpt.co.uk

---

### 37. DSSS w/BPSK

From: massong@nbnet.nb.ca (massong)  
Date: Wed, 10 Dec 1997 21:45:50 -0400  
To: ss@tapr.org  
Message-ID: <3.0.32.19971210214549.00697ee8@mailserv.nbnet.nb.ca>  
Rendered body type: text/plain

Hi, I am working on a thesis project for my BScEE degree. We are planning  
on building a  
DSSS system. We plan to use BPSk modulation with a carrier frequency of  
915 Mhz. We  
ordered a modulator today from www.minicircuits.com, my question is, what  
do I need on  
my recieve to demodulate the BPSK signal? I believe all I really need is a  
local oscillator  
at 915 MHz which I will mix with my incoming signal, this should give me  
the original signal that  
I place into the BPSK modualor (which will be a representation of a digital  
signal). I imagine  
I will need some filters after the mixer to get rid of as much noise as  
possible... Anyhow, I hope  
someone kind enough out their can give me a basic little tutorial on some  
of the issues I might  
face when trying to demodulate the signal.. I know their are issues with  
linning up my PN code, and using a matched filter to lock onto the code  
etc,. I guess my main concern right now are the issues with trying to lock  
into the carrier frequency and demodulate the data.

Thanks for your input.

Gary

---

### 38. Re: [SS:1872] RE: SS in UK



From: Berni\_Joss@LOGITECH.COM  
Date: Thu, 11 Dec 1997 08:47:06 +0100  
To: ss@tapr.org  
Message-ID: <4125656A.002A0BAE.00@LOGITECH.COM>  
Rendered body type: text/plain

Berni Joss  
12/10/97 11:47 PM

Lee Wiltshire G0IAY wrote:

>>  
>>My first plan was to experiment with direct sequence, probably using  
>>the Stanford Telecom chipset (if I can get hold of them at a reasonable  
>>price!), although there seems to be a fair amount of choice now. Is  
>>anybody out there (US or UK) able to get hold of these chips at  
>>reasonable costs? (Is there a possibility for a TAPR group purchase?)  
>  
>Does the Stanford Telecom chipset deal with RF as well as the digital  
stuff?  
>The suggestion for a group purchase sounds a good idea, wouldn't we  
>need to be members of TAPR first?  
You might find the same or compatible chip at Zilog <http://www.zilog.com> :  
the part would be Z87200 (direct sequence) or Z87L00 (frequency hopping).  
Analog devices <http://www.analog.com> offers a 900MHz RF transceiver  
designed for the Z87L00. It might work with the Z87200 as well ...

Regards,  
Berni Joss

---

### 39. More Audio on the TAPR Radio Project

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Thu, 11 Dec 1997 04:44:46 -0600  
To: " Spread Spectrum "<ss@tapr.org>  
Message-ID: <v03130313b0b57418ef45@[208.134.134.40]>  
Rendered body type: text/plain

Texas Packet Radio Society held its Fall Digital Symposium on Dec 6th. I  
recorded all the audio and both Tom McDermott and Bob Stricklin discussed  
the radio project. So, listen to some more information about what is the  
current status and what is happening with the radio. Good talks.

<http://www.tapr.org/tapr/html/tpsr97.html>

Was also good to see the board with more parts on it Bob!

Cheers - Greg

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>

---

### 40. Re: [SS:1873] DSSS w/BPSK

From: jausten@tntech.edu (Jeffrey Austen)  
Date: Thu, 11 Dec 1997 09:36:43 -0600  
To: ss@tapr.org  
Message-ID: <v01540b01b0b5b24b4f51@[149.149.39.26]>  
Rendered body type: text/plain

>Hi, I am working on a thesis project for my BScEE degree.  
...  
>Anyhow, I hope someone kind enough out there can give me a basic little  
>tutorial on some of the issues I might face when trying to demodulate  
>the signal..  
...

Gary:

This is a non-trivial project. You need to spend some time in the library  
and, afterwards, in discussion with your instructor or advisor.

Here are a few hints:

Synchronization is the key to success. There are two synchronization  
problems to be solved. One is synchronizing to the spreading code and the  
other is synchronizing with the carrier frequency and phase. The carrier

synchronization problem is the same as that in a normal (non spread spectrum) BPSK system.

It would be very useful in the laboratory if the two synchronization problems could be separated. If possible, design the system so that the code synchronization (spreading and despreading) can be tested independently of the carrier synchronization (BPSK modulation and demodulation).

A particularly useful book on SS is "Introduction to Spread Spectrum Communications" by Peterson, Ziemer and Borth. It contains a lot of material on the synchronization problem and is probably worth trying to get through interlibrary loan if it's not in your library. Another SS book, "CDMA: Principles of Spread Spectrum Communication" by Viterbi is rather deep in math and probably isn't very useful for your project. Many other books contain a chapter or two on SS; you'll just have to look around and see what you can find.

The quote "Why waste an hour in the library when you could instead spend ten hours in the lab" is an understatement!

Jeff

---

|                    |  |                                    |
|--------------------|--|------------------------------------|
| Jeffrey Austen     |  | Tennessee Technological University |
| jausten@tntech.edu |  | Box 5004                           |
| +1 931 372 3485    |  | Cookeville Tennessee 38505 U.S.A.  |

---

## 41. Microwave part Web sites

From: James Clay French KD4DLA <kd4dla@amsat.org>  
Date: Thu, 11 Dec 1997 16:28:39 -0500  
To: ss@tapr.org  
Message-ID: <34905B07.6FFD@amsat.org>  
Rendered body type: text/plain

Hello everyone.

I just recently joined the Spread Spectrum SIG and have one question.

Does anyone have a comprehensive list of Part suppliers that have active websites?

Thanks,  
James KD4DLA

---

## 42. Virtual Textbook?

From: Lawrence Stoskopf <stoskopf@tri.net>  
Date: Thu, 11 Dec 1997 17:15:38 -0600  
To: ss@tapr.org  
Message-ID: <3490741A.B53ECBF0@tri.net>  
Rendered body type: text/plain

Many posts have been made here about SS and excellent answers posted to recurrent questions. This is an off the wall suggestion, but based on the experience of the anesthesia community with the Virtual Anesthesia Textbook, perhaps someone could start an outline for such a text here and experts on each subject add some comments/information. These could be altered by others and a very useful guide to the subject developed. The concept is not a FAQ list, but a real text intended for the ham community.

Just lurking,

N0UU

---

## 43. Re: [SS:1876] SS digest 449

From: Graeme Zimmer <zim@c031.aone.net.au>  
Date: Fri, 12 Dec 1997 13:30:43 +1100  
To: ss@tapr.org  
Message-ID: <3490A1D3.DF86D259@c031.aone.net.au>  
Rendered body type: text/plain

Gary wrote...

> Hi, I am working on a thesis project for my BScEE degree. We are planning  
> on building a DSSS system.

Hello Gary, I have just finished a similar project, so maybe I can help...

> We plan to use BPSK modulation with a carrier frequency of  
> 915 Mhz. We ordered a modulator today from [www.minicircuits.com](http://www.minicircuits.com), my question  
> is, what  
> do I need on my recieve to demodulate the BPSK signal?

There are various approaches. The simplest is probably to mix the 915 Mhz  
downto about 100 Mhz and feed it through three parallel "demodulators" each of  
which  
feeds a separate IF strip. The IF strips will need to be quite narrow and so  
will probably  
use double conversion to 455 Khz and decent ceramic resonators.

The three demods are driven from three different "phases" (early/on-time/late)  
from your PN generator. The output from the early and late IFs develops a  
steering  
voltage to lock the PN generator in phase.....

Anyway, a useful reference is "Voice link over spread spectrum radio" by James  
Vincent  
in Electronics and Wireless World, Sept/Oct '93.

A "must have" book is "Spread Spectrum Systems with Commercial Applications"  
(Third Edition is just out) by Robert C Dixon.

Of course these days SS is usually done via direct conversion to base-band I &  
Q  
and then using DSP to sort it all out.....

If I can help further write to me at [zim@c031.aone.net.au](mailto:zim@c031.aone.net.au) ...

Cheers ..... Graeme Zimmer ..... VK3GJZ

---

#### 44. Re: [SS:1874] RE: SS in UK -- AMI Products

From: Lawrence Gruber <[lawrence@javanet.com](mailto:lawrence@javanet.com)>  
Date: Thu, 11 Dec 1997 22:30:34 -0500  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <3.0.3.32.19971211223034.006df6c4@javanet.com>  
Rendered body type: text/plain

At 01:51 AM 12/11/97 -0600, you wrote:

>  
>  
>  
>Berni Joss  
>12/10/97 11:47 PM  
>  
>  
>Lee Wiltshire G0IAY wrote:  
>>>  
>>>My first plan was to experiment with direct sequence, probably using  
>>>the Stanford Telecom chipset (if I can get hold of them at a reasonable  
>>>price!), although there seems to be a fair amount of choice now. Is  
>>>anybody out there (US or UK) able to get hold of these chips at  
>>>reasonable costs? (Is there a possibility for a TAPR group purchase?)  
>>  
>>Does the Stanford Telecom chipset deal with RF as well as the digital  
>stuff?  
>>The suggestion for a group purchase sounds a good idea, wouldn't we  
>>need to be members of TAPR first?  
>You might find the same or compatible chip at Zilog <http://www.zilog.com> :  
>the part would be Z87200 (direct sequence) or Z87L00 (frequency hopping).  
>Analog devices <http://www.analog.com> offers a 900MHz RF transceiver  
>designed for the Z87L00. It might work with the Z87200 as well ...  
>  
>  
>Regards,  
>Berni Joss  
>

I'm glad to see all this interest in SS chip sets in the U.K. I gave up  
my interest a few months ago (I don't have the technical expertise,  
resources, or time). But, I just wanted to mention that, in addition to  
Harris and Zilog, AMI (American Microsystems, Inc.) makes an SX071, SX072,  
and SX073 70 Mhz.(quadrature) modulator/osc. in addition to their SX043  
SS Transceiver and newer SX047, SX048, SX049 High data rate units  
(4 to 16 Mbps). Maybe you already know about these chips.  
<http://www.amis.com/>

I've decided to settle in for the exciting TAPR FHSS project, when it is completed!

Larry (Lawrence) Gruber  
Medford, Massachusetts USA  
lawrence@javanet.com

---

#### 45. Re: [SS:1877] Microwave part Web sites

From: Lawrence Gruber <lawrence@javanet.com>  
Date: Thu, 11 Dec 1997 22:50:23 -0500  
To: ss@tapr.org  
Message-ID: <3.0.3.32.19971211225023.006e1144@javanet.com>  
Rendered body type: text/plain

At 03:43 PM 12/11/97 -0600, you wrote:

>Hello everyone.  
>  
> I just recently joined the Spread Spectrum SIG and have one question.  
>  
> Does anyone have a comprehensive list of Part suppliers that have  
>active websites?  
>  
>Thanks,  
>James KD4DLA  
>

Very quickly, here are a few:

link listings:  
<http://www.wm7d.net/hamradio/amateur5.html#STORES>

<http://www.meci.com/>

<http://www.downeastmicrowave.com>

hope this helps.

Larry (Lawrence) Gruber  
Medford, Massachusetts USA  
lawrence@javanet.com

---

#### 46. Re: DSSS w/BPSK

From: Darryl Smith <vk2tds@ozemail.com.au>  
Date: Fri, 12 Dec 1997 19:54:36 +1100  
To: ss@tapr.org  
Message-ID: <3490FBCB.3BBA3F0@ozemail.com.au>  
Rendered body type: text/plain

OK - The Ziemler and Peterson book is out of print I believe. If it is I will give anyone who needs a copy the TIFF images on CD or over the net ( I scanned my xerox of the book at work).

It is a good book - I showed this book to my thesis supervisor a couple of years back, and he said he had had lunch with one of the authors the week before (during a one week break in lectures) in teh USA (He was telling me this in sydney) and the guy used to live next to one of the other authors....

Viterbis book is also good..... Why is it that all the authors have a strong affiliation with the Uni Of California? Also watch out for errors in both books....

Darryl  
vk2tds@ozemail.com.ai  
[Attachment: smime.p7s; application/x-pkcs7-signature; 4,258 bytes]

---

#### 47. Re: [SS:1878] Virtual Textbook?

From: RLANIER@mailb.harris.com (RLANIER)  
Date: Fri, 12 Dec 1997 08:21:58 -0500  
To: ss@tapr.org  
Message-ID: <49139600@mailb.harris.com>

Rendered body type: text/plain

We kind of went through this with the DSP list: there was going to be a virtual classroom with everyone using the same textbook and software, but it seems to have fizzled out.

I would be up to the task if we do this. Maybe we can use Tom's book as a starting point.

Just my two cents,

Tony KE4ATO

---

Reply Separator

Subject: [SS:1878] Virtual Textbook?  
Author: ss@tapr.org at smtp  
Date: 12/11/97 5:20 PM

Many posts have been made here about SS and excellent answers posted to recurrent questions. This is an off the wall suggestion, but based on the experience of the anesthesia community with the Virtual Anesthesia Textbook, perhaps someone could start an outline for such a text here and experts on each subject add some comments/information. These could be altered by others and a very useful guide to the subject developed. The concept is not a FAQ list, but a real text intended for the ham community.

Just lurking,

N0UU

---

#### 48. Re: [SS:1879] Re: SS digest 449

From: RLANIER@mailb.harris.com (RLANIER)  
Date: Fri, 12 Dec 1997 08:30:55 -0500  
To: ss@tapr.org  
Message-ID: <4913d310@mailb.harris.com>  
Rendered body type: text/plain

Hi Gary,

If I were doing this project, I would separate it into two halves: one RF and one digital. Mix down the 915MHz signal to around 455kHz using double conversion as Graeme suggested and then convert the signal to digital using an analog-to-digital converter. Then process the signal using a DSP if possible (have you had a DSP class yet?). If not, then other means would need to be used. The DSP is a good approach because it is programmable.

The two references Graeme suggests are also very good. The book by Dixon can probably be found in your library.

Have fun and let us know how it turns out.

Tony KE4ATO

---

Reply Separator

Subject: [SS:1879] Re: SS digest 449  
Author: ss@tapr.org at smtp  
Date: 12/11/97 8:45 PM

Gary wrote...

> Hi, I am working on a thesis project for my BScEE degree. We are planning  
> on building a DSSS system.

Hello Gary, I have just finished a similar project, so maybe I can help...

> We plan to use BPSK modulation with a carrier frequency of  
> 915 Mhz. We ordered a modulator today from www.minicircuits.com, my question  
> is, what  
> do I need on my recieve to demodulate the BPSK signal?

There are various approaches. The simplest is probably to mix the 915 Mhz down to about 100 Mhz and feed it through three parallel "demodulators" each of which feeds a separate IF strip. The IF strips will need to be quite narrow and so

will probably  
use double conversion to 455 Khz and decent ceramic resonators.

The three demods are driven from three different "phases" (early/on-time/late)  
from your PN generator. The output from the early and late IFs develops a  
steering  
voltage to lock the PN generator in phase.....

Anyway, a useful reference is "Voice link over spread spectrum radio" by James  
Vincent  
in Electronics and Wireless World, Sept/Oct '93.

A "must have" book is "Spread Spectrum Systems with Commercial Applications"  
(Third Edition is just out) by Robert C Dixon.

Of course these days SS is usually done via direct conversion to base-band I &  
Q  
and then using DSP to sort it all out.....

If I can help further write to me at zim@c031.aone.net.au ...

Cheers ..... Graeme Zimmer ..... VK3GJZ

---

#### 49. Re: DSSS w/BPSK

From: jausten@tntech.edu (Jeffrey Austen)  
Date: Fri, 12 Dec 1997 08:32:38 -0600  
To: ss@tapr.org  
Message-ID: <v01540b01b0b6f9107555@[149.149.39.26]>  
Rendered body type: text/plain

>OK - The Ziemler and Peterson book is out of print I believe. If it is I will  
>give anyone who needs a copy the TIFF images on CD or over the net ( I scanned  
>my xerox of the book at work).

There are three similar books. Two are by Ziemer and Peterson (and not  
Borth) titled "Digital Communication and Spread Spectrum Systems" and these  
both are probably out of print. The third book, "Introduction to Spread  
Spectrum Communications" by Peterson, Ziemer and Borth, was published in  
1995 (Prentice-Hall, ISBN 0-02-431623-7). It includes much more material on  
SS than the previous books. A quick search of an online bookstore shows  
that it is presently available.

Jeff, k9ja

---  
Jeffrey Austen | Tennessee Technological University  
jausten@tntech.edu | Box 5004  
+1 931 372 3485 | Cookeville Tennessee 38505 U.S.A.

---

#### 50. Re: [SS:1885] Re: DSSS w/BPSK

From: RLANIER@mailb.harris.com (RLANIER)  
Date: Fri, 12 Dec 1997 11:03:48 -0500  
To: ss@tapr.org  
Message-ID: <49160790@mailb.harris.com>  
Rendered body type: text/plain

Whoever wrote this, I would be interested in getting a copy. Please  
let me know.

Tony KE4ATO

---

Reply Separator  
Subject: [SS:1885] Re: DSSS w/BPSK  
Author: ss@tapr.org at smtp  
Date: 12/12/97 8:39 AM

>OK - The Ziemler and Peterson book is out of print I believe. If it is I will  
>give anyone who needs a copy the TIFF images on CD or over the net ( I scanned  
>my xerox of the book at work).

---

#### 51. RE: 1886] Re: DSSS w/BPSK

From: Marin Vidakovic <marin.vidakovic@os.tel.hr>  
Date: Fri, 11 Jul 1997 21:33:32 -0000  
To: "ss@tapr.org" <ss@tapr.org>  
Message-ID: <01BC8E42.1C30D7C0@ac27-p11-zg.tel.hr>  
Rendered body type: text/plain

How big is this stuff?

-----Original Message-----

From: RLANIER [SMTP:RLANIER@mailb.harris.com]  
Sent: 1997. prosinac 12 16:11  
To: ss@tapr.org  
Subject: [SS:1886] Re: DSSS w/BPSK

Whoever wrote this, I would be interested in getting a copy. Please  
let me know.

Tony KE4ATO

---

Reply Separator

Subject: [SS:1885] Re: DSSS w/BPSK  
Author: ss@tapr.org at smtp  
Date: 12/12/97 8:39 AM

>OK - The Ziemler and Peterson book is out of print I believe. If it is I will  
>give anyone who needs a copy the TIFF images on CD or over the net ( I scanned  
>my xerox of the book at work).

---

## 52. Re: [SS:1887] SS digest 450

From: Graeme Zimmer <zim@c031.aone.net.au>  
Date: Sat, 13 Dec 1997 14:17:58 +1100  
To: ss@tapr.org  
Message-ID: <3491FE65.1E31D99B@c031.aone.net.au>  
Rendered body type: text/plain

> The third book, "Introduction to Spread Spectrum Communications"  
> by Peterson, Ziemer and Borth, was published in 1995  
> (Prentice-Hall, ISBN 0-02-431623-7). It includes much more material on  
> SS than the previous books. A quick search of an online bookstore shows  
> that it is presently available.

Yup... I just ordered a copy from [www.amazon.com](http://www.amazon.com) ( US\$89.33)  
Thanks for the recommendation Jeff (I think it was)...

Cheers ..... Graeme Zimmer ..... VK3GJZ

---

## 53. Re: [SS:1877] Microwave part Web sites

From: bm@lynx.ve3jf.ampr.org  
Date: Sat, 13 Dec 1997 19:11:33 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <199712131911.TAA04493@lynx.ve3jf.ampr.org>  
Rendered body type: text/plain

James Clay French KD4DLA <kd4dla@amsat.org> wrote:

>  
> Hello everyone.  
>  
> I just recently joined the Spread Spectrum SIG and have one question.  
>  
> Does anyone have a comprehensive list of Part suppliers that have  
> active websites?

Check out Lee Fry's listings at

<http://www.mindspring.com/~lfry/part15.htm>

I see that they haven't been updated in more than a year, though... you still  
out there, Lee?

Barry

--

|                           |              |  |           |                                                                    |
|---------------------------|--------------|--|-----------|--------------------------------------------------------------------|
| Barry McLarnon            | VE3JF/VA3TCP |  | Internet: | <a href="mailto:bm@hydra.carleton.ca">bm@hydra.carleton.ca</a>     |
| Ottawa Amateur Radio Club |              |  | AMPRnet:  | <a href="mailto:bm@lynx.ve3jf.ampr.org">bm@lynx.ve3jf.ampr.org</a> |
| Packet Working Group      |              |  | Web:      | <a href="http://hydra.carleton.ca">http://hydra.carleton.ca</a>    |

---

## 54. Re:Ziemler and Peterson

From: Darryl Smith <vk2tds@ozemail.com.au>  
Date: Sat, 13 Dec 1997 21:43:20 +1100  
To: ss@tapr.org  
Message-ID: <349266C7.3A871587@ozemail.com.au>

Rendered body type: text/plain

OK - I just checked, I do have Zeimler and Peterson here; Scanned in using Tiff Group 1 one file per page (Imageing for windows which comes free with windows 95/NT will read them). I think it was scanned at 200 DPI which makes smaller files.

Under Australian copyright law, since this book is unavailable, and will not be available for the next 90 days, is able to be copied for private study. I assume the same law applies to the rest of teh world.

The 350 or so files take up 27 MBytes - Which is quite large. I have not yet put them through an OCR which is my custom - I have about 10,000 pages of personal information (Magazines, Thesis material etc) scanned.

I am quite happy to distribute this book provided it is to a location where such copying is legal - for teh purposes of private study. 26 MBytes is a lot of information. I can put this onto a ZIP disk or CD-ROM which might be easier for some poepl to handle.

DISCLAIMER: The offer of this book is being made as it is unavailable from stores subject to copyright restrictions.

Darryl Smith  
VK2TDS@Ozemail.com.au  
Sydney, Australia

---

## 55. Re: [SS:1890] Re:Ziemler and Peterson

From: Lawrence Stoskopf <stoskopf@tri.net>  
Date: Sun, 14 Dec 1997 17:44:37 -0600  
To: ss@tapr.org  
Message-ID: <34946F65.15C6FE9E@tri.net>  
Rendered body type: text/plain

Darryl Smith wrote:

> OK - I just checked, I do have Zeimler and Peterson here; Scanned in  
> using Tiff  
> Group 1 one file per page (Imageing for windows which comes free with  
> windows 95/NT  
> will read them). I think it was scanned at 200 DPI which makes smaller  
> files.  
>  
> Under Australian copyright law, since this book is unavailable, and  
> will not be  
> available for the next 90 days, is able to be copied for private  
> study. I assume the  
> same law applies to the rest of teh world.  
>  
> The 350 or so files take up 27 MBytes - Which is quite large. I have  
> not yet put  
> them through an OCR which is my custom - I have about 10,000 pages of  
> personal  
> information (Magazines, Thesis material etc) scanned.  
>  
> I am quite happy to distribute this book provided it is to a location  
> where such  
> copying is legal - for teh purposes of private study. 26 MBytes is a  
> lot of  
> information. I can put this onto a ZIP disk or CD-ROM which might be  
> easier for some  
> poepl to handle.  
>  
> DISCLAIMER: The offer of this book is being made as it is unavailable  
> from stores  
> subject to copyright restrictions.  
>  
> Darryl Smith  
> VK2TDS@Ozemail.com.au  
> Sydney, Australia

Put me down for either type copy.

N0UU

---

## 56. The 2nd SS experiment in Japan

From: Katsuhiko MOROSAWA <jh0mrp@dl.hlb.casio.co.jp>  
Date: Mon, 15 Dec 1997 20:56:05 +0900 (JST)  
To: ss@tapr.org  
Cc: prug96@netadm.ntt-at.co.jp



Message-ID: <34951AD51CC.85A4.jh0mrp@dl.hlb.casio.co.jp>  
Rendered body type: text/plain

Last Sunday, we practiced 2nd SS experiment in Kofu-Valley, Yamanashi prefecture, and tried long-distance QSO.

The system were almost same as what we had used in the 1st experiment in Kitakyushu (and Shimonoseki). The output power of SS transceiver was less than 100mW (maybe 20mW or so) and the antenna was 27 elements beam which has 24dbi of front gain.

This time, we set one station on the top of Budogaoka (which means the hill of grapes, in Japanese). Another members moved around Kofu area, and operated from 4 different points.

Point A (5 kilo meters from Budogaoka): Ping statistics was 100%, quite good. We tried WWW browsing from both direction and voice conversation with cool talk. Both of them worked very comfortable, simultaneously.

Point B (15 kilo meters from Budogaoka): Ping statistics was 100%, but the direction of antenna was more severe than it was at point A. We tried keyboard chat with the talk command and didn't feel any frustration at all. Although we didn't try browsing nor voice chat between point B and Budogaoka, we were convinced that it worked well if we tried it, because ping statistics was 100%.

Point C and D (30 kilo meters from Budogaoka): Ping statistics was nearly 20% at its peak. The condition was bad and unstable. We measured BER and it was almost 1E-2. I think a few db would be enough to make the condition stable.

I will report more precisely on my webpage, soon.

Attendance: 7M3LCG, JE1WAZ, JF1PXI, JH1FBM, JJ1CEI, JK1MLY, JN1JDZ, JQ1VIE, JS1DCF and 7K1NCP

--

Katsuhiko "Kay" MOROSAWA (JH0MRP, 7K1NCP)  
<http://www2s.biglobe.ne.jp/~jh0mrp/>

---

## 57. Nominations Sought for TAPR Board of Directors

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Thu, 25 Dec 1997 18:17:14 -0600  
To: "TAPR-BB list mailing" <tapr-bb@tapr.org>,  
"HF SIG list mailing" <hfsig@tapr.org>,  
"Spread Spectrum" <ss@tapr.org>, "TAPR/AMSAT DSP" <dsp@tapr.org>,  
"APRS SIG list mailing" <aprssig@tapr.org>,  
"NETSIG list mailing" <netsig@tapr.org>,  
"BBS SIG list mailing" <bbssig@tapr.org>,  
"tacgps" <tacgps@tapr.org>, "MIC-E Beta" <mic-e@tapr.org>  
Message-ID: <v03130309b0c8a625a448@[206.138.226.73]>  
Rendered body type: text/plain

Nominations Sought for TAPR Board of Directors  
(as printed in 1997 PSR #68, p. 34)

Tucson Amateur Packet Radio is incorporated in the State of Arizona as a non-profit scientific and educational institution. It is recognized by the IRS as a 501(c)3 tax-exempt organization for these same purposes. TAPR is governed by a 9-member Board of Directors. Each member of the Board serves a three year term. Every year three positions are up for election.

Board members are expected to attend two board meetings held in conjunction with the Dayton Hamvention and the ARRL and TAPR Digital Communications Conference. They participate in the decision-making process and provide guidance to the officers. They receive no pay and must defray most of their own expenses to attend meetings. Board members should be prepared to be active in the continuing Board deliberations, which are conducted via the Internet. Active participation in TAPR activities by Board members is important to the furtherance of the objectives of TAPR. The officers of TAPR are elected by the members of the Board at the annual Board of Directors meeting.

The current members of the Board of Directors and their expiration dates of their terms are:

|                         |      |                |
|-------------------------|------|----------------|
| * John Ackermann, AG9V  | 1998 | Vice President |
| * Jim Neely, WA5LHS     | 1998 | Treasurer      |
| * Barry McLarnon, VE3JF | 1998 |                |
| Steve Bible, N7HPR      | 1999 |                |

|                    |      |            |
|--------------------|------|------------|
| Gary Hauge, N4CHV  | 1999 |            |
| Bob Hansen, N2GDE  | 1999 | PSR Editor |
| Greg Jones, WD5IVD | 2000 | President  |
| John Koster, W9DDD | 2000 |            |
| Mel Whitten, K0PFX | 2000 |            |

Nominations are now open for seats expiring in March 1998 (marked with an asterisk).

To place a person in nomination, please remember that he or she must be a member of TAPR. Confirm that the individual is willing to have their name placed in nomination. Send that person's name (or your own if you wish to nominate yourself) along with your call and their call, telephone numbers, mailing address, and Internet address. The person nominated should submit a short biographical sketch to be published along with the ballot.

Nominations and biographical sketches should be submitted to the TAPR office no later than December 31st, 1997.

Ballots will be mailed with the next PSR. TAPR will again use an Internet ballot, so read your ballot carefully. Results will be announced on March 30th, 1998.

Responsibilities of a board member include:

- 1) Attendance at both board meetings each year.
- 2) Regular participation with the continuous session of the board (currently held over the Internet). Typically this requires a minimum of 3 hours a week, although sometimes much more is required during active board discussions.
- 3) Participation with TAPR projects as volunteered. Board members, while not required, are involved with various project management, ongoing organization and/or supervision/liaison positions. Active board participation with various projects make many of the most important projects and tasks possible. Board members are expected to take an active part in TAPR in some form.

All nominated members will be placed on the ballot and the highest vote receivers will be placed in the open board positions. If elected, two board meetings in 1998 will be held. One will be during Dayton Hamvention and the other during the ARRL and TAPR Digital Communications Conference. All directors shall serve for a term of three years.

-----  
Tucson Amateur Packet Radio  
8987-309 E Tanque Verde Rd #337 \* Tucson, Az \* 85749-9399  
-----

e-mail: [tapr@tapr.org](mailto:tapr@tapr.org) web: <http://www.tapr.org/>  
ftp: [ftp.tapr.org](ftp://ftp.tapr.org)  
phone: 940-383-0000 fax: 940-565-2544  
-----

## 58. 900 MHz Data Radios for Sale

From: John Ackermann N8UR <[jra@febo.com](mailto:jra@febo.com)>  
Date: Sat, 27 Dec 1997 10:42:00 -0500  
To: [ss@tapr.org](mailto:ss@tapr.org)  
Message-ID: <199712271542.KAA29714@meow.febo.com>  
Rendered body type: text/plain

(This isn't quite on topic, but Greg suggested that folks here might be interested in this.)

Our club was given several non-spread spectrum data radios operating in the 950MHz range. I believe that they can be converted to 902-928, but the manufacturer has given us some conflicting information (different people saying different things) and frankly we don't have the time to figure it out. So, we'd like to sell them and turn the proceeds into some spread spectrum gear (see, there *is* a connection with this mailing list after all!).

Here are the details:

Manufacturer: Multipoint Networks, Inc. (still in business in California).  
Models: 4 each RAN-64 (64kbps full duplex, 2 each RAN-128 (128kbps,

full duplex)

These make three matched pair of radios. All are full duplex, 5 watt output, with heavy duty duplexers (they operate with a 3.6 MHz split at 950MHz!). I/O is RS-422 synchronous; when I looked at the information, it appears they should interface to an Ottawa PI card with a couple of level conversion chips.

The radios are early 1990s manufacture, and the company is still in business. They use a QPSK style modulation scheme, and are semi-synthesized -- an EPROM and dip switches provide a number of channels in a couple of MHz range. The 64kpbs radios operate in 100kHz channels, while the 128kpbs units are spaced at 200kHz. We have a limited amount of documentation available; support is still available from the manufacturer.

The radios are in cabinets 17" wide x 13" deep x 3 3/4" high; the duplexers are the same footprint but are 5 1/4" high. The radios have self-contained 110 volt power supplies.

These units were in service for about three years (actually, one pair is a spare set that's only had a few hours of operating time) and are in excellent condition. Although they're primarily intended for full duplex point-to-point operation, it appears that the radios can also be configured to operate as half-duplex RF repeater.

In addition to the radios, if someone wants to pick them up in Dayton we also have four "paraflector" clipped dish antennas about five feet wide and three feet high that were used with this equipment.

I'm sure this gear must have cost a fortune, but I have no idea what its current worth is. If you're interested, drop me an email and we can talk.

73,  
John N8UR (ex-AG9V)  
jra@febo.com

---

## 59. Transmission Line Attenuation Chart

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Tue, 30 Dec 1997 00:03:36 -0600  
To: " Spread Spectrum "<ss@tapr.org>  
Message-ID: <v03130305b0ce3dc943f3@[206.138.226.117]>  
Rendered body type: text/plain

I just put up a new page on the TAPR SS page called Transmission Line Attenuation Chart. The information is collected from several places, but mainly from the Hutton catalog.

Seems that I keep getting asked this question at various talks and presentations, so figure I can now point to this page.

The plan is to actually turn the page into a sort of snapshot on coax and connectors over time. What to get and possibly what to avoid -- like those screw on N-connectors that ham stories seem to try to get you to purchase ;-) along with a few pictures. Who sales what and the suggested retail prices from the mfg to help estimate how much money you might be spending. That extra \$1.00 a foot might be worth it a 2.4G with a 200mw radio :-)

Anyway, take a look. <http://www.tapr.org/tapr/html/coax.html>

Cheers - Greg

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>

## 60. Re: [SS:1895] Transmission Line Attenuation Chart

From: John Ackermann N8UR <jra@febo.com>  
Date: Tue, 30 Dec 1997 08:05:18 -0500  
To: ss@tapr.org  
Message-ID: <199712301305.IAA07336@meow.febo.com>  
Rendered body type: text/plain

> I just put up a new page on the TAPR SS page called Transmission Line  
> Attenuation Chart. The information is collected from several places, but  
> mainly from the Hutton catalog.

Good info -- particularly since a lot of charts don't show figures for  
900MHz directly and you have to extrapolate.

If you can find it, you might want to add info on the CATV aluminum  
hardlines. I'll see if I have anything on them.

John

---

## 61. Re: [SS:1895] Transmission Line Attenuation Chart

From: bm@lynx.ve3jf.ampr.org  
Date: Tue, 30 Dec 1997 17:16:07 +0000 (GMT)  
To: ss@tapr.org  
Message-ID: <199712301716.RAA24721@lynx.ve3jf.ampr.org>  
Rendered body type: text/plain

"Greg Jones, WD5IVD" <wd5ivd@tapr.org> wrote:

>  
> I just put up a new page on the TAPR SS page called Transmission Line  
> Attenuation Chart. The information is collected from several places, but  
> mainly from the Hutton catalog.  
>  
> Seems that I keep getting asked this question at various talks and  
> presentations, so figure I can now point to this page.  
>  
> The plan is to actually turn the page into a sort of snapshot on coax and  
> connectors over time. What to get and possibly what to avoid -- like those  
> screw on N-connectors that ham stores seem to try to get you to purchase  
> ;-) along with a few pictures. Who sells what and the suggested retail  
> prices from the mfg to help estimate how much money you might be spending.  
> That extra \$1.00 a foot might be worth it a 2.4G with a 200mw radio :-)  
>  
> Anyway, take a look. <http://www.tapr.org/tapr/html/coax.html>

You may recall that I had a similar table at the end of my DCC paper on RF  
propagation. The table is available separately at:

<http://hydra.carleton.ca/articles/atten-table.html>

Feel free to grab it and merge it with yours, or whatever. I haven't  
compared them to see if they agree or not. :-)

-Barry

ps: for anyone who missed it, the full paper is at

<http://hydra.carleton.ca/articles/ve3jf-dcc97.html>

--

|                           |              |  |                                                                             |
|---------------------------|--------------|--|-----------------------------------------------------------------------------|
| Barry McLarnon            | VE3JF/VA3TCP |  | Internet: <a href="mailto:bm@hydra.carleton.ca">bm@hydra.carleton.ca</a>    |
| Ottawa Amateur Radio Club |              |  | AMPRnet: <a href="mailto:bm@lynx.ve3jf.ampr.org">bm@lynx.ve3jf.ampr.org</a> |
| Packet Working Group      |              |  | Web: <a href="http://hydra.carleton.ca">http://hydra.carleton.ca</a>        |

---

## 62. Re: [SS:1896] Re: Transmission Line Attenuation Chart

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Tue, 30 Dec 1997 13:32:26 -0600  
To: ss@tapr.org  
Message-ID: <v03130308b0cefca31d8d@[206.138.226.138]>  
Rendered body type: text/plain

If you can locate the information, will be glad to add it.

Greg

>> I just put up a new page on the TAPR SS page called Transmission Line  
>> Attenuation Chart. The information is collected from several places, but  
>> mainly from the Hutton catalog.

>  
>Good info -- particularly since a lot of charts don't sho figures for  
>900MHz directly and you have to extrapolate.  
>  
>If you can find it, you might want to add info on the CATV aluminum  
>hardlines. I'll see if I have anything on them.  
>  
>John

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>

---

### 63. Re: [SS:1897] Re: Transmission Line Attenuation Chart

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>  
Date: Tue, 30 Dec 1997 13:42:03 -0600  
To: ss@tapr.org  
Message-ID: <v0313030cb0cefeeba6c9@[206.138.226.138]>  
Rendered body type: text/plain

Thanks Barry. Forgot about that one. I'll be sure to grab the 5.8G entrys  
and add those.

Greg

>  
>You may recall that I had a similar table at the end of my DCC paper on RF  
>propagation. The table is available separately at:  
>  
><http://hydra.carleton.ca/articles/atten-table.html>  
>  
>Feel free to grab it and merge it with yours, or whatever. I haven't  
>compared them to see if they agree or not. :-)  
>  
>-Barry  
>  
>ps: for anyone who missed it, the full paper is at  
>  
><http://hydra.carleton.ca/articles/ve3jff-dcc97.html>  
>  
>  
>---  
> Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca  
> Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jff.ampr.org  
> Packet Working Group | Web: <http://hydra.carleton.ca>

-----  
Greg Jones, WD5IVD  
Austin, Texas  
wd5ivd@tapr.org  
<http://www.tapr.org/~wd5ivd>

---